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THE FRENCH PLAN OF CONCENTRATION AND THE COLLAPSE OF AUGUST, 1914.

BY COLONEL W. A. MACBEAN, LATE R.A.

(NOTE.—The map accompanying Part I will be required for Part II which will appear in the May Journal).

PART I.

IN August 1914 Germany contrived to spring a complete strategic surprise upon France. That this should have been possible, after the subject of a coming Franco-German war had been exhaustively examined and discussed in military circles for forty years, is one of the marvels of military history. During the war the causes of the immediate French collapse in the initial operations necessarily remained obscure. Since the peace, however, many facts have come to light. A copious military literature has appeared in both France and Germany. In particular, the publication of the French plan of concentration,[1] and the first volume of the official "History of the Great War" have been a great help. In this connection the appearance of the French official history is also awaited with lively interest, for since the issue in the winter of 1914-15 of the note entitled "Four months of war," which can hardly be considered an acceptable contribution to military history, the French General Staff has remained silent regarding the first phase of the operations.

In this article an endeavour will be made to trace the causes of the French strategic *débâcle*.[2]

THE FORCES AVAILABLE.

At the outbreak of war France had at her disposal about 3,500,000 trained men. Germany had over 4,000,000.[3] France placed in the field in first line the equivalent of 24 corps.[4] Germany put 35 corps in first line on the western front. All the French corps were of the active army. Of the German corps, 22 were active and 13 were so-called reserve corps, only slightly inferior in quality to the active units.[5]

[1] Engerand, La bataille de la frontière, p. 191. Translation in Army Quarterly, 1921.

[2] Abbreviations—G.Q.G., Grand Quartier Général; A. Army; B.E.F., British Expeditionary Force; C. Corps; C.D. Cavalry Division; C.I. Minutes of Evidence, Commission of Inquiry on the loss of the Briey basin; G.S. General Staff; H.G.W.I. History of the Great War, Vol. I.; H.Q. Headquarters; R.C. Reserve Corps; R.D. Reserve Division. German units are shown in Roman figures.

[3] H.G.W. I. p. 15.

[4] Reducing all corps to terms of 2 divisions, including odd divisions, and reckoning 37th and 38th D's as the 19th Corps. Detail; 1 to 21 C. and Colonial C. Extra divisions in Colonial and 6 C, Morocco D, 44th D. Alpine groups are not included. See H.G.W. I. Appendix 3.

[5] The entire confidence of the German G.S. in the Reserve Corps is shown by the fact that in the 1st and 2nd Armies, which would probably have the hardest fighting and certainly the hardest marching, the proportion of reserve to active corps is higher than elsewhere. In the 1st and 2nd A's it is 6 to 7. In the remainder, taken together, it is 7 to 15.

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In second line France had at the outset 14 reserve divisions, and a number of Territorial divisions, the latter of practically no military value. Germany had a few reserve divisions not included in reserve corps, and a number of *Landwehr* and *Ersatz* formations. Since France might, had timely measures been taken regarding her reserve troops, have placed the equivalent of 40 corps in first line for the first shock, the question naturally arises why she did not do so, instead of being outnumbered by 35 to 24.

In 1870 the French long service professional army of the Crimea and Solferino went down before the German armed nation, and it was generally thought that France, having learned her lesson, would thenceforth adopt the method of her conqueror and become a nation in arms. But the spirit of the old professional army was still alive. In the military administration, of which the G.S. was always the guiding spirit, there was a certain jealousy and distrust of the reserve troops. Further, as the idea of taking the offensive in the next war against Germany began to grow from about 1892,[1] it was argued that reserve troops would be unfit for offensive operations. In any case they would not be required. The war was to be a short one. The first battles were to be decisive, and were to be won by the active army,[2] attacking always and everywhere. The same idea inspired the dislike of the G.S. for heavy artillery. It was not sufficiently mobile, and would be unable to keep up with the field armies hurrying forward to cross the Rhine. Hence, little use was made of the abundant material at hand, for France had enough trained men to enable each active regiment to form a reserve regiment of equal strength. Thus, either reserve corps equal in number to the active corps might have been formed on mobilization or, as was proposed by General Michel,[3] the establishment of the mobilised active corps might have been raised to some 70,000 men by the incorporation of reserve troops. Neither of these solutions were adopted. Instead, each mobilised active corps was to be reinforced by a fifth brigade of six reserve battalions, and in addition, a number of reserve divisions were to be formed for the defence of fortresses, coastguard work, etc., and for second line work with the field armies. In 1913 it was officially announced in Parliament that reserve troops would not be put in first line, thus definitely informing Germany how many corps she would have against her. Under Joffre[4] the reserve troops were crippled still further. In 1913-14 he reduced all reserve regiments from 3 battalions each to 2, thus reducing the strength of the reserve troops by one-third. He also abolished the brigadier commanding the reserve brigade in the active corps and thus destroying it as a combatant unit.[5] Finally, in a circular issued in the spring of 1914, it was directed that all reserve

[1] M. Engerand dates this about 1887.

[2] Not long before the war General de Castlenau, *sous-chef* of the G.S., said, "Give me 700,000 professional soldiers and I will make the tour of Europe." (Percin, Les erreurs, p. 28).

[3] Joffre's predecessor as C.G.S.

[4] Appointed C.G.S of the Army in July, 1911.

[5] Percin, 1914. Les erreurs du haut commandement.

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troops were to be employed solely for non-combatant work such as escorting prisoners and convoys. Ultimately they might be utilized in first line, but only when sufficiently trained.[1]

This was not all. The reserve troops were made the rubbish-heap of the active army. Inefficient and undesirable officers were transferred to the reserve and earmarked for the reserve troops on mobilization. Inefficient warrant and N.C.O's were transferred to the reserve cadres. As for peace training, there was none. The reserve units were never even embodied.

Thus deliberately rendered inefficient they took the field in 1914. When, after all, they had to be at once used in first line they were at first, naturally, unequal to the work and let the commander down.[2] With the best will in the world they were unreliable, although they might fight well when entrenched. In studying the first operations they may practically be left out of account.

When the German General Staff first decided to put reserve troops in first line is not known, but it was probably in connection with the von Schlieffen plan of 1905. Closely watching French action, the matter was kept as secret as possible.[3] Cadres were carefully selected, and the reserve units were periodically embodied for training, but foreign officers were not invited to be present at manœuvres. Reserve divisions were not openly organized in corps in peace time, since this would have shown Germany's hand, but the necessary staffs were in being. Judicious steps were taken to mislead France. It was put about that the Emperor was adverse to the employment of reserve troops in the first battles. Von der Goltz expressed the same view. In the Reichstag various speakers dilated on the crime of putting fathers of families and peaceful shopkeepers in the forefront of the battle. These declarations were eagerly accepted in France. If Germany intended not to send her reserve troops to the first battles, why should France do so?

But the French G.S. cannot have been taken in, for, as General Percin points out, a memorandum from the G.S. addressed to the *Conseil supérieur de la guerre* in 1911 stated that upon mobilization each German active corps would form a reserve corps, and that in the German G.S. war games these corps were employed in first line. This makes the neglect of the French reserve troops wholly inexplicable. It can only be supposed that the French G.S. doubted the efficiency of the German reserve corps and assumed that if used at all in first line they would be sent to the Russian front. But obviously it was wholly unsafe to make such an assumption. It was always clear that Germany would send every man that could be spared from the Eastern front against France in the first instance. The most careful inquiry into the degree of organisation, equipment and training of the

[1] Percin, "Les erreurs."

[2] E.G., at Onhaye 23rd, Guise 29th, Bapaume 28th, Vosges 21st August, Château Thierry, 3rd September.

[3] In the German pre-war army list there is no reference to reserve troops.

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German reserves should have been made and the requisite counter-measures taken.

The persistent neglect of the French reserve troops and the miscalculation as to the German reserve corps were to have dire results. The G.S. expected that France, with 24 corps, or 27 with the B.E.F., would have to meet only 20 to 22 German corps, according as Germany put 5 or 3 corps on the Russian front. This seems to be the key to the consistent under-estimation by G.H.Q. of the German strength during the first operations, and the consequent under-estimation of the scope of the German manœuvre. Of all the faults committed by the G.S., this matter of the reserves was the most flagrant and unpardonable.

THE GERMAN PLAN.

After 1870 France, with Alsace-Lorraine "torn from her bleeding side," had to create a new military frontier. The work of General de Rivières is too well known to need description. It was never completed, and except as regards Verdun, Toul, Epinal and a few of the barrier forts was allowed to fall into decay from 1900; but its inevitable result was to push the line of a future German invasion either north or south of the new frontier,[1] and with the growth of the army, German violation of neutral territory became certain. Rejecting the Switzerland side,[2] Belgium remained. Up to 1892, Germany might have contented herself with violating Luxemburg and directing the marching wing on Mézières. But the signing of the Franco-Russian alliance in that year created an entirely new situation. Germany had to prepare for a war on two fronts.

Possessing interior lines, she might turn against Russia or against France first. In the first case she would, at any rate until Russia was disposed of, carefully refrain from violating Belgium or Luxemburg territory. In conjunction with Austria, she would of course have totally defeated the Russian armies. But the objective on the eastern front is distant and uncertain. If only temporarily, territory would have to be surrendered on the western front and the war would be greatly prolonged. The scheme has certain merits in that it would probably keep the British Empire out of the war and would create great difficulties for France, bound in honour to take the offensive between Luxemburg and Switzerland. But, on balance, the plan must be rejected.

Resolving, therefore, to turn first against France, a quick decision must be obtained before Russia can dispose of the unreliable Austrians and establish herself firmly on German territory.[3]

[1] De Rivières clearly foresaw the invasion by the left bank of the Sambre—Meuse.

[2] This operation, pivoting on Metz, with the left wing either crossing a corner of Swiss territory or penetrating the Belfort gap, is too divergent, and the topographical difficulties are too great; not so much for the left wing, so long as it confines itself to French territory, capturing Belfort by a hastened attack, but owing to the difficulties which the right and centre would have to overcome. The whole operation is too slow and uncertain.

[3] An officer of the German Great G.S. once said to the writer, "We shall win in spite of the Austrians."

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It should be noted here that Germany could feel quite certain that the five French armies would be deployed on the front Belfort-Mézières of Hirson, that their mass would be found in Alsace-Lorraine, and that they would attack between Metz and theVosges.[1] The French themselves disclosed their intended deployment from Belfort to Mézières by publishing the boundaries of the corps regions in their Army List. It was also known that the covering troops amounted to one corps per army. Taking these data together, reference to a military map of France clearly shows the disposition of the five covering corps and consequently of the armies. Also, study of a good railway map of France reveals seven obviously strategic railheads meeting the line Epinal—Mirecourt—Toul—Lérouville, while between Lérouville and Mézières there are only three. This points to a large concentration in Lorraine, and, with due appreciation of the French desire to reconquer her lost provinces, there could be no reasonable doubt as to the main French offensive in Lorraine.

Remembering Germany's need of rapid and decisive action against France, to assemble the German mass on the front Thionville—Vosges and meet the French mass frontally can promise no early and decisive results. Accordingly, Germany decides to remain on the defensive on this side, and in 1893 she began to develop the defences of Metz and the Strasbourg—Molsheim position. The French left flank is the obvious objective, and in 1893 Germany commences to develop her railways leading to the Belgian frontier.[2] The whole operation pivoting on Thionville and Metz, how far north must Germany extend her front in order to make reasonably sure of enveloping that flank? To direct the right wing on Mézières, debouching on the strong line of the Meuse is evidently futile. The Meuse must be crossed lower down.

The gorge of the river between Mézières and Givet, 26 miles in a straight line, forms a very important military feature. It is, in fact, the key to the defence of the Franco-Belgian frontier. Here is the densest part of the Ardennes forest, extending from north to south all the way from Mézières to Givet and from east to west about 17 miles. The river, about 100 yards wide, winds between high slate cliffs, the steep wooded hills above rising in places to 1600 feet. Permanent bridges are few. On the left bank a high road leads from Mézières viâ Rocroi and Fumay to Givet, but on the right there is only one indifferent road, leading from Vireux Wallerand, 5 miles S.W. of Givet, to Monthermé. The German right therefore cannot cross between Mézières and Grivet, and must be directed lower down. It may attempt to cross between Givet and Namur, but there are grave objections to this. Even if the crossing were at first unopposed, the right wing would be completely isolated from the centre until they could re-unite, which at the very earliest could be done on the line Hirson—Mézières—Sedan. On the other hand, the crossing might be

[1] Alsace is obviously a subsidiary theatre.

[2] The writer visited the Eifel in 1895. The work was then well in hand.

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opposed. The German right, arriving at the river, might find itself completely held up by the French army holding the left bank, with its left resting on the Sambre, and that French army, if of adequate strength, is perfectly secure until strong German forces, crossing the Meuse below Namur, turn the Namur—Givet line by advancing to the Sambre.[1] Hence Germany is practically *forced* to operate by the left bank of the Meuse—Sambre. It is simply a matter of providing the necessary troops, and this she does in the shape of her surprise packets, the reserve corps. The number of corps crossing below Namur (13) is exactly equal to the number of the reserve corps placed on the western front—a careful calculation on the part of the German G.S., even if it subsequently proved erroneous.

Once the Meuse from Givet to the Dutch frontier is in German hands there is no further physical obstacle in the path of the German right wing. The country, open, level, and with good communications, is for the most part highly cultivated and can furnish supplies. All this favours a rapid advance. Everything depends upon quickly capturing the Meuse fortresses and getting the right wing well away.

PLAN 17[2] IN THEORY.

A certain amount of information is available concerning the French plans of concentration anterior to Plan 17.[3] The earlier schemes are, naturally, based on the hypothesis of German invasion through the Charmes gap. In all of them the guiding idea is the indirect defence of Paris by means of the flank position, facing north, the armies being disposed in several echelons, south of the latitude of Epinal. Very slowly, the centre of gravity moves north, the reluctance of the G.S. to accept the hypothesis of German invasion through Belgium being evident. This hypothesis is not accepted until 1906, but from 1911 onward it is considered certain.[4]

In 1911 General Michel, then C.G.S., propounded an entirely new scheme.[5] He foresaw that the Germans would violate Belgium and, operating by the left bank of the Meuse—Sambre, would seek to extend their front to the sea, and then consequently they would have to employ their reserve troops in first line. Therefore, France must make intensive use of her reserve troops in order to avoid being outnumbered by two to one. He proposed to do this by doubling the strength of each army corps. The heavy artillery was also to be increased and re-organised.

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[1] This explains v. Hausen's caution on the 22nd and 23rd Aug., until the II. Army is firmly established on the right bank of the Sambre.

[2] The plan which governed the French concentration in August, 1914.

[3] Margueritte, "Au bord du gouffre," p. 95.

[4] According to "Le secret de la frontière," p. 213. But see Plan 17, Mission of 5th A.

[5] Percin, "Les erreurs," p. 42.

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His proposed disposition was :—

Between Lille and Avesnes.	490,000 men, to take the offensive in Belgium.
Between Hirson and Rethel	280,000
Paris, reserve	220,000
East, ultimately to attack	500,000
Total	1,490,000 men.

For having dared thus to contravene the opinions of his subordinates, especially with regard to the employment of reserve troops, Michel was dismissed in disgrace, and his project was rejected with contumely.[1]

Plan 16 of 1908, as modified by Plans 16 *bis* and 16 *ter*[2] in 1911 and 1913 respectively is roughly as follows :—

The dispositions includes "front," "wings," and "reserves." Front, 3 armies : 1 A. 5 corps in area Chaumont, Langres, Toul, Epinal : 2. A. 2 corps, St. Dizier, Gondrecourt, etc. : 3. A. 3 corps, Bar le Duc, Pierrefitte, Revigny. All three armies face N.E. Wings :—1 army, 4 corps, in the Vosges; 1 army, 3 corps between Amagne and Mézières. Reserves :—I army, 5 corps, of which 3 with their front on the line Grand Pré—Varennes—Clermont on Argonne, 2 in the plan of Champagne.[3]

Plan 17 came into force in February 1914. It is, shortly, as under :—

1. Probable that a large part of enemy forces will be concentrated on the common frontier, and may cross this in places before our operations can develop.

2. *Intention.* Whatever the circumstances, to attack with all forces united. Two main operations : on the right, between Vosges and Moselle below Toul; on the left, N. of a line Verdun—Metz. These operations to be connected by forces on the Hauts de Meuse and in the Woëvre.

3. *General Distribution.* 1st and 2nd A's operate at first between Rhine and Moselle; 5th A. and Cavalry Corps N. of line Verdun —Metz; 3rd A. the connecting link. 4th A. provisionally in 2nd line, ready to move up N. or S. of 3rd A.

4. *1st A.*, 5 corps, 2 c.d's[4] to attack on the line Baccarat—Sarrebourg—Sarregemuines, right of main body following crest of Vosges, extreme right in Alsace. To co-operate in offensive of 2nd A., which is to move on Château Salins. To be ready on the Meurthe on 12th day of mobilization. A special group, 1 corps and 1 c.d., to be ready on 4th day of mobilization to advance from Belfort, etc., on Colmar; to attack any enemy forces attempting to debouch W. of the Vosges, and to promote an insurrection in Alsace.

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[1] The story of the conspiracy against Michel, engineered by the G.S. with the active connivance of the War Minister, is told by Percin in "Les erreurs."

[2] Engerand. "La bataille de la frontière," p. 185.

[3] The arrangement seems quite unintelligible. Five armies are "*en cordon*" from Epinal to Mézières, with a strategic advance guard in the Vosges, of all places. In Plan 16, as unmodified, the left of the armies it at Vouziers.

[4] 7, 8, 13, 14, 21 C. 6, 8 C.D's.

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5th. *2nd A.*, 5 corps, 2 c.d's.[1] to be ready to attack on Château Salins and Sarrebruck. Initial front, Lunéville—Grand Couronné. Ready 12th day.

6. *3rd A.*, 3 corps, 1 c.d.[2] To be ready to force back any enemy debouching from Metz or Thionville, or to prepare investment of Metz. To protect Meuse Heights. Ready 12th day for general offensive from a line Domèvre-en-Haye—Vigneulles—Ornes, and keep forces in hand to co-operate with 2nd A. on right bank of Moselle or with 5th A. in northern Woëvre.

Note for 3rd and 5th A's.

(Directions for the covering troops).

7. *4th A.*, 3 corps, 1 c.d.[3] H.Q., St. Dizier. To be ready either to debouch in northern Woëvre, between 2nd and 3rd A's., or to move N, to engage on the left of 3rd A., towards Arlon.

8. *5th A.*, 5 corps, 1 c.d.[4] between Ville-sur-Tourbe and Aubenton, H.Q., Rethel. Zone of action: from the Argonne to Vervins & Hirson, but cannot be fixed at first as regards movement towards the N.

To act against right wing of enemy, whether the theatre of operations is at first limited to the territory of the belligerents or whether it is immediately extended to neutral territory (Luxemburg and Belgium).

In the first case, etc. (omitted here). In the second case, but only by order of C.-in-C., the 5th A. will move N.E. on Neufchâteau and Florenville. The 4th A. would place itself on the right of the 5th, and would engage between 3rd and 5th towards Arlon.

The Cavalry Corps would form the left of this mass of manœuvre.

9. *Cavalry Corps*, 3 divisions, at the disposal of C.-in-C. In the event of operations being extended to neutral territory, to be at once ready to move and meet the enemy columns, especially those appearing in Belgian Luxemburg, S. of the difficult region Houffalize—St. Hubert. It will reconnoitre these columns and retard their movement . . . . The 148th Infantry Regiment,[5] passing under the orders of the Cavalry Corps, to move as rapidly as possible on Dinant to occupy the Meuse bridges, unless the Belgian Government has taken the initiative in doing this.

A secret note annexed to the plan provides for the assembly of the B.E.F. between the lines Vervins—Hirson and Le Cateau—Landrecies—Maubeuge.[6]

Such is the celebrated Plan 17. It was never discussed by Joffre with his army commanders. Discussion was avoided by issuing to each commander only that part of the plan which concerned his own army, so that the commanders could only form an idea of the whole plan by comparing notes. Of the five army commanders three, Dubail, Ruffey and Lanrezac, also Gallieni, late an army commander,

[1] 9, 15, 16, 18, 20 C. 2, 10 C.D's, 3 R.D.'s. The Grand Couronné is a range of heights 8 to 12 m. from Nancy, extending from N. to E.N.E. of Nancy.
[2] 4, 5, 6 C. 7 C.D. 3 R.D's.
[3] 12, 17, Colonial C. 9 C.D.
[4] 1, 2, 3, 10, 11 C. 4 C.D. 5 R.D's.
[5] From Givet.
[6] "La bataille," p. 46.

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are known to have been opposed to the scheme. Nor was it ever shown to the *Conseil Supérieur*.[1]

The following remarks are submitted :—

1. The basis of the plan is the assumption that a great part of the enemy forces will be assembled on the common frontier; hence the retention of the hypothesis of German non-violation of neutral territory and the very strong right wing, nearly half of the available French forces.

If this assumption prove erroneous, the whole plan breaks down. It is a gamble.

2. The idea of an early French offensive appears in the French concentration close up to the frontier[2] and in para. 1 of the plan.

3. Believing that the Germans will have only about 20 corps at their disposal and therefore cannot afford to extend their right north of Mézières, the French left is placed near that point, and the road viâ left bank of the Meuse—Sambre is left open.[3]

4. There is evident disbelief in a German violation of Switzerland,[4] and France appears to have been always fairly sure of Italian neutrality, for only the Alpine troops remain on the Italian frontier.

5. Germany's will to war; her form of government, which enables her to commence mobilization secretly, her superior numbers; her known unscrupulousness as to violating neutral territory; uncertainty on the part of France as to the attitude of Belgium in the event of a German invasion;[5] the comparative slowness of Russian mobilization; all these factors impose an expectant attitude upon France and the retention of a strong strategic reserve. But the plan contemplates a general offensive, for which France has not the troops, and the strategic reserve of three corps is quite inadequate.

6. For some years before the war the most pernicious views, favouring the violent and reckless offensive, strategic and tactical, always and everywhere, had increasingly infected the young officers of the G.S. and the army. The plan attempts to graft these ideas upon the waiting attitude that circumstances inexorably impose upon France. Thus, while the 1st and 2nd A's are to make the attack demanded by sentiment, an expectant attitude has to be prescribed for the remainder. And in every subsequent directive the fatal "if" creeps in, the alternative due to possible enemy action which has to be kept in view.

7. There is complete failure to appreciate the effect of ground upon military operations, and the principle of economy of force. In

[1] Lanrezac. "Le plan de campagne Français," p. 48.

[2] Considerably closer than in the anterior plans.

[3] Let a straight line be drawn from Berlin to Paris. This line, which, incidentally, passes through or near the peace H.Q. of 5 German army corps, passes through Mèziéres. Germany places 17 Corps N. of this line, 18 S. of it. Distances from this line, measured perpendicularly in miles, are: Aix 30, Mons 56, Verdun 53, Epinal 136, Belfort 180. Nearly the whole of the French armies are S. of this line; only the extreme left of the 5th A. is north of it.

[4] Provided against by posting 3 reserve divisions at Vesoul.

[5] It seems to have been believed in the life-time of Leopold II that he would have consented to German occupation of Belgian territory. Even in August 1914, the attitude of Belgium was at first very dubious.

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particular, the strong concentration upon the common frontier, strong for defence on both sides, is inadvisable for attack and unnecessary for defence. And, finally, the plan fails to recognize that rapidity of execution must be the essence of the German operations, and that France should delay the decision and give Russia time to act.

What induced France to concentrate in the east?

First and foremost, sentiment regarding the lost provinces; the desire for their early reconquest and to wipe out the defeats of 1870 upon the ground where they had been suffered.[1] In assuming the principal German concentration to be there the wish was father to the thought.

The G.S. also professed great anxiety as to a German "hastened attack" (*attaque brusquée*) to be made within a few hours of the declaration of war.

By the hastened attack is meant an attack made by a comparatively small force of unmobilized troops upon some special objective close to the frontier, and is made by the covering troops.[2] It is thus a relatively minor operation. But in 1913 the coming German *attaque brusquée* assumed grandiose proportions in the imagination of the French G.S. The explanation is that at that time the law of three years' colour service was under discussion in parliament, and the G.S. wished to get it passed in order to increase the peace strength of the army. Consequently, it was urged that the reinforcement of the covering troops was necessary to parry the hastened attack, and that the only way of doing this was to increase colour service to three years. Further, the G.S. stated that the German covering troops were so strong that they would be able to move at a few hours' notice,[3] and it was even put about that eight German corps could take the field in a few hours, and that 900,000 Germans would take Nancy before breakfast. The three years' law was finally passed, but the G.S. had talked so much about the accelerated attack that possibly they ended by believing in it themselves. Be that as it may, to think that the Germans, the disciples of Scharnhorst, the creators of the nation in arms and the advocates of methodical mass action would upset their whole mobilization and concentration by making an accelerated attack upon any great scale was a strange concept.[4] And if the German attack was so greatly feared it may be asked why the strengthening by means of extempore defences of the Hauts de Meuse, the Grand Couronné of Nancy and of Verdun was neglected,[5] and why no adequate

[1] General Malleterre writes: "Who thought of Charleroi? Who thought of battles elsewhere than in Lorraine, to deliver our Alsace, our Vosges, our dear Lorraine."

[2] E.g., Liége, and had the Germans been able to foresee the prolongation of the war and the immense expenditure of artillery ammunition, they would certainly have at once occupied the Briey iron district in order to prevent the French destroying the mines. As it was, the Germans destroyed some of the mines themselves.

[3] By General Pau, delegated by the G.S. to address the Senate, July 1913 (Percin, p. 161). In point of fact the German cover was much weaker than the French, and was not posted until the 3rd August. (*Bulletin Belge des Sciences Militaires*, August, 1920).

[4] The present writer once had the opportunity of reading the report of the German military attaché at Paris upon the French manœuvres of 1891. In it the possibility of a *French* accelerated attack was discussed, but as a quite minor operation.

[5] Engerand. Le secret de la frontière.

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railway communication with the latter place had been provided.

Some mention must also be made of what is known as the railway carriage plan.

In 1913 a certain Colonel Buat, formerly orderly officer to the *Conseil Supérieur de la guerre* and one time a professor at the Staff College, published an anonymous pamphlet,[1] in which he alleged that when travelling in Germany in the spring of 1913 he had found under the seat of a railway carriage a document embodying the German plan of concentration,[2] and in his pamphlet he apparently gave the detail of the plan. He sent a copy to all senior generals of the French army.

Several theories are abroad with regard to the railway carriage document, which is somewhat reminiscent of the celebrated *bordereau* of the Dreyfus case. One theory is that the document really existed, and was planted on Buat by German agents. Another is that it never existed, but was imagined by Buat in order to lend weight to his views.[3]

In the pamphlet, which has now disappeared, it was argued that the Germans could enter France with 22 corps,[4] 1,300,000 men strong, of which 900,000 of the active army, forming the "shock mass" and 400,000 reservists; that the reserve troops would receive secondary missions; that this army, covering itself towards the Meuse, would march on the French frontier east of Mézières; and that therefore the French armies should take post facing N.E. on the front Belfort—Mézières.[5]

There would be no occasion to refer to this matter but for the circumstances that, if not the whole Plan 17, at least the Intelligence Report of 6th August (q.v.) and G.Q.G's first directive (General Instruction No. 1, q.v.) are almost certainly based upon the entirely incorrect data of the pamphlet.

Lastly, it is certain that at various times the French G.S. was deceived by the German G.S. as to German intentions. This was done by means of calculated leakages regarding imaginary war games in which either the German right was directed on Mézières, or attack from Metz was threatened.[6]

PLAN 17 IN PRACTICE.

30th July.

The five French covering corps receive telegraphic orders to take post. The concentration, except as regards units from Africa, is to be completed on 12th August. The African units are to be in line on 18th August.

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[1] The identity of the writer was not given to the public until 1915.

[2] Percin "Les erreurs," p. 167.

[3] M. Engerand, *rapporteur* of the C.I., has, however, apparently seen a copy, for when the Intelligence Report of 6th Aug. (q.v.) is under discussion, he says "It agrees with the document found in a railway carriage." ("Au bord du gouffre," p. 344).

[4] This number is subsequently reduced by the G.S. to 20 corps in Intelligence Report of 6th Aug. Engerand, "La bataille," p. 63.

[5] Percin, p. 168.

[6] See Engerand "Le secret," p. 280. Army Quarterly, October 1922, p. 153.

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2nd August. 1st day of French mobilization.

Joffre orders the 4th A. on arrival to move up between the 3rd and 5th. On this day German troops entered Luxemburg territory, apparently in the morning, and the ultimatum to Belgium was presented at 7 p.m. It seems probable therefore that the movement of the 4th A. was motived by the German entry into Luxemburg.

It is submitted that to absorb the strategic reserve at this stage is a serious error. The situation is quite undeveloped, and much may happen by the 12th August. On that day the French armies will be strategically deployed facing N.E. They will be able to manœuvre only by wheeling, and the front can be extended only by "side-slipping" or by withdrawing corps from the armies. The only logical sequel will be to take the offensive everywhere as soon as the concentration is completed.

It may be noted that the insertion of the 4th A. will merely thicken the front between Verdun and Mézières and not extend it.[1]

4th August.

In the morning German cavalry enter Belgium and move on Visé and Lixhe.

Small columns of all arms cross the Meuse. Further concentrations were reported to the south, and it became evident that a very large army threatened invasion.[2]

5th August.

The attack on Liége commences, and it evidently becomes a matter of the first importance to G.Q.G., to obtain early information about these proceedings. Whether French intelligence officers were at once despatched to the Belgian army does not appear. Colonel Brécart, sent to Brussels on this day to arrange if possible for the co-operation of the Belgian army, returns on the 8th without having achieved anything definite, and in his report there is no mention of an intelligence liaison.[3] Except on the 15th August, when G.Q.G. seems to have received fairly prompt information regarding the German crossing at Visé there seems to have been no proper intelligence liaison at all. We must look to the French official history for eventual enlightenment on this point.

6th August.

Sordet's cavalry corps of three divisions passes the Belgian frontier near Sedan, and it is convenient to summarize its subsequent wanderings here.[4] Allotted in Plan 17 the limited strategic mission of reconnoitring enemy columns south of the "difficult" region—

[1] See General Instruction No. 1 of 8th August; Mission of 5th A.

[2] H.G.W.I., p. 31 *et seq.*

[3] "La bataille," p. 61.

In the *Times* of 15th August, 1914, it is stated in a Brussels telegram that three French officers had arrived the previous day at Belgian H.Q., but if this is correct, valuable time has been lost. It would have been an obvious step to post observers just inside the Dutch frontier, opposite Visé and Aix, as soon as possible.

[4] Lanrezac, pp. 66, 74, 82, 90, 97. Palat III., pp. 58, 61, 85. H.G.W., I., p. 36.

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Houffalize—St. Hubert, it is now, still under G.Q.G. orders, directed upon Neufchâteau with the protective mission of guarding this part of (Belgian) Luxemburg, presumably until the arrival of the three cavalry divisions of the 3rd, 4th and 5th A's.[1] This seems unnecessary. No German troops are reported W. of a line Bastogne—Arlon,[2] and the Ardennes forest is no country for cavalry.[3] Small infantry posts pushed forward by the two covering corps (2nd and 6th) and assisted by the corps cavalry, could have done the work better.

However, the news of the attack on Liége having now (presumably) reached G.Q.G., Sordet is pushed in that direction. After finding strong enemy positions on the upper Ourthe, presumably between Houffalize and Laroche,[4] his advanced squadrons arrive within 9 miles of Liége on the 8th. But, instead of remaining near Liége and Namur and retiring on the Sambre when necessary, the corps, still remaining under G.Q.G., is again assigned the protective duty[5] of covering the front of 5th A., and if forced to re-cross the Meuse, of covering the concentration of B.E.F. round Marienbourg and Chimay. Accordingly Sordet retires to Froidlieu (5 miles E.S.E. of Beauraing) and Rochefort on the 9th, moves south to Paliseul, and then goes N. to Beauraing.[6] On the 15th, hearing guns towards Dinant, he marches in that direction and is checked by enemy infantry entrenched on the Lesse. Crosses the Meuse at Hastières and Givet the same day. The corps now passes under the orders of 5th A,[7] but on the 16th G.Q.G. orders it, over Lanrezac's head, to push N. of the Sambre to co-operate with the Belgian army. On the 17th Sordet crosses the Sambre and concentrates at Fleurus. Hearing of enemy cavalry about Perwez—Ramillies—Offus, he resolves to attack it on the 18th in co-operation with the Belgians—is fired upon by Belgian troops and retires west between Wavre and Gembloux. On the 19th comes in contact with strong enemy forces near Perwez and retreats on Fleurus, and on the 20th retires behind the Charleroi—Brussels canal, holding the passages between Gosselies and Séneffe. On this day Sordet is once more placed under Lanrezac.[8] Outflanked west of Gosselies, he retires on Merbes-le-Château, and on the 22nd is ordered to guard the passages of the Sambre between the left of the 5th A. and Maubeuge. On the 23rd, once more under the orders of G.Q.G..,[8] he closes on Maubeuge in order to pass behind the B.E.F., and take

[1] Lanrezac, p. 66, mentions his cavalry division (4th), but does not give the date of its arrival.

[2] Intelligence Report of 8th August, "La 3e division d'infanterie" (Regnault), p. 17.

[3] On the other hand it is just the country for an intelligence service, previously organised. While the French with 3 c.d's on their immediate front find out very little up to the 22nd August, the German IV and V Armies seem to have relied almost entirely on their spies and to have had full information regarding the movements of the 3rd and 4th A's.

[4] Occupied by covering troops III Army.

[5] General Instruction No. 1 of 8th August.

[6] Palat (III, 6. 61) states that S's movements between the 9th and 15th August were: 11th at Sart, reconnoitring on Neufchâteau; 12th, at Sart, reconnoitring on Sohier. Halt, 13th and 14th. To Hastières on 15th.

[7] Special Instruction No. 10 of 15th August.

[8] Lanrezac, pp. 97, 168.

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post on its left.[1] Here he may be left. Apart from the vacillations of G.Q.G., his peregrinations afford an interesting illustration of the impossibility of combining the strategic and protective duties of cavalry.

The results of Sordet's reconnaissances in the Ardennes were not great. They were made too early, for the German armies, apart from covering troops, had not then commenced their advance. He, however, discovers enemy troops on the upper Ourthe and Lesse, facing south, which are evidently screening some important move further north. See also his important report of 14th August. After arriving on the Sambre he is outweighted and his horses are exhausted.[2]

5th August.

German attempt to take Liége by assault.

6th August.

Certain inferences might have been drawn by G.Q.G. from the German attack on Liége. In the first place, if, as is believed, the German right will be directed upon Mézières, the possession of Liége is not necessary to the Germans. The right column would march viâ Malmédy, Marche, Rochefort, Wellin and Gedinne, which route nowhere approaches within 15 miles of the Meuse. Two reserve corps and the available *Landwehr* would amply suffice to hold the Belgians on the line of the river, should they attempt to get busy on the right bank. Nor are the railways passing through Liége necessary for supply purposes, for without them three lines remain available, viz., 1. Cologne—Pepinster—Trois Ponts—Bastogne—Libramont; 2. Cologne or Andernach—Ulflingen—Ettelbrück—Diekirch—Arlon; 3. Coblenz—Trèves—Luxemburg—Longuyon.

Also on the night of the 5th/6th August the Germans made a night attack on Liége, and they dislike making night attacks on any considerable scale except with some very urgent purpose; and when the report comes on the 7th August that troops belonging to five different corps are attacking the fortress,[3] it should have confirmed G.Q.G. in the inference that the Germans were in desperate need and desperate haste, for the Germans also greatly dislike disturbing their order of battle and using heterogeneous forces, even in daylight. Consider also von Jagow's declaration to the Belgian ambassador at Berlin on the 4th August: "Let the Belgian army *abstain from breaking the bridges*;[4] let it allow us to occupy Liége . . . . and we promise not only to respect Belgian independence, but also to . . . . ," etc., etc.; and on the same day to Sir E. Goschen: "We must penetrate into France by the shortest and easiest route, in order to get a good start . . . . if we had passed further south . . . . we could not . . . . hope to pass without meeting with formidable opposition, involving great loss of time . . . . *Rapidity is Germany's master card.*"[4]

[1] On the 24th at Avesnes, Sordet, in conversation with Sir J. French, informs him that he has not received this order ("1914," p. 68). This explains the subsequent crossing of the lines of march of Sordet and the B.E.F. on 25th August.

[2] By the 20th the corps had lost 3,000 horses (Palat).

[3] "La bataille," p. 64.

[4] Writer's italics.

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All this clearly points in one direction, but G.Q.G. is not impressed.[1]

On this day G.Q.G. issues an intelligence report,[2] the substance of which is :—

German concentration . . . Details of the movement of columns cannot yet be given, but, collating the reports received regarding the initial emplacements, it may be concluded that *the Germans are executing a plan of concentration conceived two years ago, and which we came to know of* .[3]

Facing France there would be five armies in three groups; right, centre and left.[4]

Right group; 3 armies (15 active corps); northern army, 5 corps, 2 or 3 reserve divisions . . . . Centre of gravity, St Vith;[5] southern armies, one of 4 corps, the other of 6 corps, between Trèves and Sarrebourg. These (southern) armies have no reserve divisions, which seems to indicate that they essentially form the shock troops.[6]

Centre group; one army of 4 corps, 1 reserve division, between Sarrebourg and the Vosges.

Left group; in Alsace, 1 active and 2 reserve corps.

Total against us, 20 active and 2 reserve corps.

. . . . Against Russia, 5 active and 10 reserve corps.

The probable connection of this report, which is, of course, entirely erroneous and misleading, with Plan 17 and the railway carriage plan has already been indicated. It should also be pointed out that, covering troops apart, the transport of the German armies to the theatre of war only commenced on the 5th August.[7] We are therefore forced to conclude that the report is *not* based upon intelligence actually and recently received, as is implied at its commencement, but is, in short, fictitious. The gravity of adopting it as the basis of the first operations need not be enlarged upon.

It will be noticed that nearly the whole of the German reserve corps are lightheartedly assumed to be on the Russian front, and on this point G.Q.G. will only be disillusioned when too late. And with the remark that for Germany to place 22 corps on the western and 15 on the eastern front would be a division of forces which the German G.S. would certainly never be guilty of, we may pass on.

6th August.

Lanrezac, uneasy as regards the situation at Liége, sends his chief of staff[8] to G.Q.G. to represent the danger to the French left.

[1] It is argued in "Le plan 17" (Anonymous) that G.Q.G. were justified in believing the attack on Liége to be a feint.

[2] No. 1. Found after the war by General Sarrail among his papers and produced at the C.I. Apparently it is the only copy that can be traced.

[3] Writer's italics. This is taken to refer to the railway carriage plan. See p. 11.

[4] Cavalry is omitted here.

[5] Seven miles N. of the north point of Luxemburg. The march of the German right on Mézières is clearly indicated.

[6] Compare the wording "shock troops" with the similar wording in Buat's pamphlet. See p. 11.

[7] Bulletin Belge, August, 1920.

[8] From Rethel.

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Joffre replies: "What! General Lanrezac is afraid again of being outflanked on his left.[1] Such an eventuality is not to be feared. Besides, if it did happen, so much the better."

The G.Q.G. idea of a French offensive in the Ardennes is taking shape.

8th August.

G.Q.G. issues the first directive, General Instruction No. 1,[2] in amplification of Plan 17. Comparing the two, it is found that:—

Under the heading of information, it is now stated that the mass of the German armies appears to be round Metz, behind Thionville, and in Luxemburg.[3] In the north, a German army comprising portions of 5 corps has penetrated into Belgium.

In front of the 1st and 2nd A's the enemy forces do not appear to exceed 6 corps.[3]

The attack on Liége has so far influenced G.Q.G. that it is stated that the French left may have to be drawn back, but that if the German right should be delayed before Liége, or should turn south, the French left may be advanced.

The attack by the 1st and 2nd A's is adhered to, also the expectant attitude of 3rd A. The 4th A., now in line, is to assemble in the Argonne, and be ready to counter-attack any enemy forces which may cross the Meuse below Vilosnes (N.W. of Verdun), or to cross the Meuse itself below Verdun. The 5th A. is to close together between Aubenton and Vouziers,[4] and be ready to counter-attack should the enemy debouch between Mouzon and Mézières, or to cross the Meuse itself between those points.[5]

But what has become of the "attack with all forces united"? Somehow, the G.S. doctrine that an offensive must be persisted in, even if based upon incomplete information, does not seem to work. The 3rd, 4th and 5th A's remain expectant. Also G.Q.G. plainly does not attach any importance to the Liége attack. This is fitted in with the old hypothesis of the march of the German right through the Ardennes.

9th August.

Information given by a German prisoner captured in Ardennes by Sordet's cavalry reaches G.Q.G.[6] This is to the effect that Germany has mobilised 62 corps. Of these, 23 are to detrain in Belgium; of these 12 are to march on Liége, occupy Brussels and Antwerp, and subsequently march on Paris with the remaining 11 corps.

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[1] Lanrezac had addressed a memorandum to Joffre in this sense on the 31st July (Lanrezac, p. 54).

[2] "La bataille," p. 200.

[3] Cf. Intelligence Report of 6th August.

[4] i.e., it does not move to the left.

[5] A directive to 5th A. (not published) says that it is in this case to attack on the front Neufchâteau—Paliseul—Gedinne. Lanrezac, pp. 50, 86.

[6] The prisoner stated that his information was derived from his father, who held an important command in the Guard Corps. "La bataille," p. 71.

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It has been urged that this report should have finally convinced G.Q.G. of the importance of the Liége move. This cannot be wholly admitted. The number of mobilized corps is obviously exaggerated, and the same might apply to the rest of the information, unless corroborated from another source—but, on general grounds, G.Q.G. should by now be persuaded that very serious importance attaches to German proceedings on the Liége side.

10th August.

G.Q.G. Intelligence Report[1] indicates that the principal German detrainments are taking place behind Metz and Thionville. This erroneous report and a letter from Joffre to the commander 3rd A.[2] show that the attention of G.Q.G. is still firmly fixed on Metz.

[1] Palat III., p. 59.
[2] "La bataille," p. 71.

(To be continued).

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"AUSTRIA & HUNGARY."

A Lecture delivered at the Royal Artillery Institution on Tuesday, February 20th, 1923.

By COLONEL F. W. GOSSET, C.M.G., D.S.O.

Major-Gen. Sir W. E. IRONSIDE K.C.B. C.M.G., D.S.O. in the Chair.

THE CHAIRMAN: Gentlemen, I have great pleasure in introducing to-night Colonel Gosset who is going to lecture us on "Austria and Hungary." He is a Gunner Officer of great repute, and he has been in touch with the question since long before the War. He was on the General Staff looking after the Austrian Section when the War broke out, and has been out there until quite recently representing the British Army, and he will tell us really how things are at the moment.

It is a double pleasure for me to introduce him because at one time he was major of a battery here at Woolwich and I was his captain.

GENERAL IRONSIDE AND GENTLEMEN:

The title of this lecture—Austria and Hungary—has been chosen with a view to laying stress on the fact that the former Dual Monarchy of Austria-Hungary has now been split up into a number of different and mutually antagonistic countries.

Nationalities. The twelve races composing the former Empire may be roughly grouped under five heads: Germans, Magyars, Slavs, Italians and Jews. In this grouping, two points deserve notice: firstly, that there is no mention of an Austrian, and secondly, that a Magyar is a Hungarian first, last, and at all time, but it did not, and even now does not, follow that a Hungarian is a Magyar.

As regards the first point, Austria never had much national feeling as such, although in each province (Styria, Carinthia, Tyrol, etc.) there is a very considerable provincial *esprit de corps*. Consequently the irredentist movement is comparatively negligible, except perhaps on the part of the pro-German inhabitants.

In Hungary, on the other hand, the national solidarity and dominating character of the Magyar race leads them still to refer to their lost districts as the "Occupied Territories," and constantly to scheme and plot for their reconquest—the result is that all Hungary's neighbours are frightened of her and persist in maintaining large armies, which fact, in turn, is utilized by Hungary as an excuse for adopting every artifice to evade the effect of the disarmament clauses of the Treaty of Peace.

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Origin of the Magyars. The inwardness of the intense patriotism of the Magyar may, I think, be ascribed to the fact that they are an off-shoot of the great Turanian race, surrounded by Aryans, and it may be of interest if I describe very briefly their origin. In the remote past, the Turanians inhabited a large part of Central Asia. Their other principle descendants to-day are the Japanese, the Finns and the Turks. After prolonged settlement in the Urals, the Magyar portion of the Turanian race migrated to the Volga where they formed part of the Kingdom of the Bulgars. After overthrowing the latter and their successors, the Khazars, the Magyars settled in the territories now known as Bessarabia, Bukovina and Moldavia. Driven hence by the allied Bulgars and Pechenagos, their seven independent tribes combined under the leadership of a single chief named Arpad. Following the examples of their predecessors and kinsmen, Attila and the Huns, and later, the Avars, they crossed the Carpathians about the Verecze Pass and settled in the region of the Upper Theiss in 895 A.D.

The Magyars first overthrew the Kingdom of Moravia and then, successively, the Bulgars, Serbs, Croats and Avars in the south, completing the conquest of the entire region by 906 A.D.

This forcible intrusion of a non-Aryan race altered the whole subsequent history of Central Europe: the northern Slavs were separated from the southern, with the result that the former, cut off both from Rome and Constantinople, were compelled to look to Germany for their civilization and religion.

Origin of Austria. Austria, first known as such towards the end of the tenth century, was the buffer state created by the Emperor of of Germany to ward off the ever recurring attacks of the savage, though virile, Magyar intruders, and the initial enmity thus aroused has never entirely disappeared.

Austria-Hungary. Although the Turkish conquest of Hungary in the 16th century and subsequent events forced Hungary to accept the Hapsburgs as their monarchs, the methods employed by the suzerain power were aimed rather at destroying all semblance of the Magyar national spirit than at securing the affection and loyalty of a proud and patriotic race. Even as late as 1848, the Magyars beat the Austrians in battle, and the latter were only saved by the intervention of Russia in overwhelming force. Eventually, the "Ausgleich" of 1867 led to a "modus vivendi," although even at the outbreak of war the Hungarian Honved or Army was allowed no artillery of its own and all arms and ammunition factories were established in Austria.

In spite of this, the Hungarians fought well in the Great War, and had it not been for the question of Burgenland or West Hungary, to which I shall refer later, it is just possible that Austria and Hungary might, in their common adversity, have turned to each other for support and friendship.

Attitude of Slav Races. The attitude of the Slav races during the war was on the other hand disloyal and even treacherous. Nor

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can this be wondered at—oppressed by both Germans and Magyars for centuries, they were asked to fight their kindred whose cause they felt was their own. I doubt whether the Germans in Czecho-Slovakia would fight well if ordered to march on Berlin. The early defeats of the Austro-Hungarian army were compared by the Germans to their victory at Tannenberg and the advance through Belgium, and utilized by them to obtain virtual command of the Dual Monarchy's forces. I do not think that the conduct of the German officers and troops in Austria-Hungary created a favourable impression, however, and the effect on the Slav troops was disastrous.

Disruption of Austria-Hungary. With the final victory of the Allies, the disruption of the Austro-Hungarian Empire which had long been considered probable on the death of the old Emperor Francis Joseph, could no longer be delayed. The Allied Powers have been accused of Balkanising South Eastern Europe, and, although Mr. Lloyd George's retort, that the Austro-Hungarian Empire was not split up by the Powers but "blew up of itself," has a certain amount of foundation, it cannot be denied that it was the allies who lit the fuze without taking due precautions to limit the effect of the explosion. The results have probably exceeded their expectations and can hardly be said to be satisfactory from the point of view of anybody.

Attitude of Great Powers. In considering the results, and apart from the internal situation and foreign policies of Austria and Hungary themselves, it is important to bear in mind the following factors affecting the attitude of the Great Powers in this part of the world :—

a. Great Britain has her hands full elsewhere, and desires nothing but the re-establishment of trade and the maintenance of Peace.

b. France labours under an overpowering fear of Germany in the future. Her endeavours are therefore directed to forming a Franco-phil block out of Poland, Czecho-Slovakia and Jugo-Slavia, as a counterpoise to Germany. Many of the more important appointments in the Czecho-Slovak Army are held by French officers, and France has spent and lent millions to arm and equip Poland and Jugo-Slavia.

c. Italy fears the rise of a new and powerful opponent on her eastern frontier. An opponent who would be a possible rival to her in the Adriatic and Eastern Mediterranean.

She would be glad of an ally to fall, if necessary, on the flank and rear of Jugo-Slavia.

The Economic Factor. Finally, there is the economic factor which affects both countries, but more especially Austria, in a vital degree.

Owing to the depreciation of the currency, and the rise in prices with the resulting rise in wages, the cost of living has advanced by leaps and bounds. For a very simple dinner in Vienna, you pay now the pre-war equivalent of £4000 sterling (about 6/- to-day). The main

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sufferers by this state of affairs are the professional and salaried classes—the Cabinet Minister draws little, if any, more pay than the coal miner, and the cost of a pair of silk tights would absorb the entire wages of a ballet girl for five months. The logical deduction is that the Cabinet Minister and the ballet girl work mainly for love.

The Austrian peasant does nothing to facilitate the supply of food to Vienna, although the city contains nearly one-third of the Austrian population of 6½ millions. Of this population, 800,000 officials (including their families) are maintained by the State.

Hungary is self-supporting as regards the necessities of life, and has a considerable surplus of agricultural produce available for export and to pay for her imports. Austria, on the other hand, exists on the charity of the Great Powers, and, apart from her timber, is dependent on the work of the population for her exports.

It is therefore much easier for the Great Powers to exercise economic pressure on Austria than on Hungary.

Austria and Germany. Although, as I have pointed out, there is but little national feeling in Austria, the Germans are trying, with considerable success, to work up the feeling of solidarity with the German nation. Since 1920, plebiscites, held by the provincial authorities in Austria, have resulted in very large majorities in favour of "Anschluss" or adhesion to Germany, and, although these plebscites were doubtless "made" by the officials and financed by Germany to a very large extent, there is reason to believe that "Anschluss" would meet with but little opposition in Austria. The Social Democrats (townsmen and industrial workers) favour adhesion to a German Republic, the Christian Socialists (peasants and farmers) would probably prefer a more monarchical form of Government and look to Bavaria, whilst the small but influential Gross-Deutsch party strains every nerve, as its name implies, to bring about an "Anschluss" of any sort. It cannot, however, be anticipated that France would consent to such an accession of man-power to her dreaded enemy without making every effort to prevent it. How far Italy would be inimical to "Anschluss" is a debatable question. Italy desires a common frontier with Germany for commerical reasons, and possibly "compensations" in the Tyrol and Carinthia would suffice to induce her to withdraw any opposition.

Austria and the "Little Entente." Austria is, at present, on friendly terms with the "Little Entente," more especially with Czecho-Slovakia who has lent her money. But should anything happen in this region—should the "Anschluss" for instance be brought about—there is a danger that the Czechs might occupy Vienna and endeavour to establish a corridor connecting Czecho-Slovakia and Jugo-Slavia, or the north and south Slavs. I only put this forward as a possibility that will bear thinking over owing to the incalculable effect it would have on the future of Europe.

Communism in Austria. The only other political question affecting Austria to which I propose to refer is that of Communism.

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The Hungarians, and a large proportion of Austrians have no hesitation in expressing their hatred (or fear) of "Red Vienna" and undoubtedly many Hungarian and other Bolshevists have found a haven there whence to continue their subversive propaganda. But I do not think Communism in Austria is a serious danger at the present moment: the Christian-Socialist party are almost conservative in their ideas, and we should call the majority of the Social Democrats nothing worse than radicals.

In the case of a successful Russian Bolshevist advance, Communism would spread amongst the social democrats, and the Austrian Army or Wehrmacht, might, under these conditions, suffice to enable Bolshevist sympathisers in Austria to seize the power and to throw Austria into the scale on the side of the enemies of civilization. Although the Wehrmacht contains but a moderate percentage of Communists at the present moment, it is strongly imbued with socialist doctrines, mainly owing to its having been formed as a party weapon by the social-democratic party, to the existence of the Soldier's councils, and to the continued presence of Dr. Julius Deutsch at the War Office. If the economic situation in Austria deteriorates further and the resulting misery becomes more widespread, the socialistic tendencies of the army will become more pronounced and may render it liable to yield to such a temptation as would be provided by any considerable Bolshevist success.

Hungarian Politics. Hungary, on the contrary, has had her experience of Bolshevism, and there is but little likelihood of a recurrence.

The Magyar of to-day is by nature bellicose, proud, very hospitable, self-confident and apt to be a bully when in a position of authority. He is more than fully conscious of his racial superiority over the surrounding nations. Although it is doubtful whether the peasant cares much what Government he is under, so long as he can till sufficient land to keep himself and his family and can sell his produce, yet he is easily carried away by oratory, music and theatrical display. Except for a small proportion of industrial workers in Budapest and one or two mining districts, it may be assumed that the population is monarchist, but, in Hungary, one might almost call politics the national sport of the educated class, and, as the Magyar strongly resembles the Irishman, it is easy to imagine the result.

At the last elections, in May, 1922, I think there were over 20 political parties striving for place and power.

Apart from questions of interior economy, the main struggle lay between the Karlists and the anti-Karlists, the latter forming the Government. Many of the Government Party are also legitimists, but realise that the time is not ripe for a restoration of the Hapsburgs in defiance of the Treaty of Trianon.

The two Karl "Putsches" in April and October, 1921, greatly embittered the antagonism between the extremists of both parties, but strengthened the "antis." The death of King Karl, if it continues to be properly handled, should go a long way towards bringing about

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an understanding on the lines of the tacit acceptance of Otto (a boy of 11) as the future King, and of Admiral Horthy, a first class, honest sailor, as Regent.

The elections resulted in a very large majority for the existing Government. Of course, they were "made": coercion was freely employed, opposition candidates and supporters imprisoned or beaten, &c., &c., but any other Government in Hungary would have done the same, and, if the present Government were turned out, the danger of a conflagration would be greatly increased under a Karlist or under an extreme irredentist Government.

The accession of a Hapsburg is vetoed in the Peace Treaty mainly on account of the fear of Czecho-Slovakia, Jugo-Slavia, and of other countries, that such an event would tend to produce an irresistible movement amongst the Croats, Slovenes, Slovaks, &c., in favour of a personal union of those provinces under a Hapsburg monarch.

The "Little Entente," consisting of Czecho-Slovakia, Jugo-Slavia and Roumania, was originally founded by that astute statesman, Benes, with a view to enforcing the strict application of the Treaty of Trianon, and to preventing the possibility of Hungarian or Hapsburg supremacy, and they would, I think, be supported by the Social-Democratic party in Austria. At the same time, it is difficult to see what other solution to the Hungarian King question is possible.

Hungary's Foreign Relations. I think the relations between Hungary and the "Little Entente" may be best described as of "hostile neutrality," and, on at least one occasion in the last two years, war has been on the verge of breaking out. Although many Magyars are confident that they could beat the Little Entente, they realise the need for a friend somewhere in Europe, and, failing England, claim that they are being driven into Germany's arms, although the Italians, for reasons I have mentioned, are making tremendous propaganda to establish Italian influence to the north of Jugo-Slavia.

Allotment of Frontiers. When the allotment of frontiers to the new states was under discussion at Paris, it must be remembered that the "Big Four" were obsessed by the catch word of "self-determination," were acting under the necessity of fulfilling promises made during various crises of the war, and were largely influenced by delegations of the less cultured races of the Dual Monarchy who, under great provocation it must be confessed, had played the traitor to their country and their Emperor.

Thus it was that the frontiers were fixed on an ethnological basis, qualified by a spirit of "vae victis," and many economic and military factors were neglected.

In certain districts, where there was a doubt as to the preponderance of one nationality, plebiscites were arranged, and it is a remarkable commentary on the principle of allotting frontiers in accordance with an ethnographic map that, in one case at least, the result of the plebiscite was not in accordance with the nationality of the inhabitants but was due to economic reasons.

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Geographical Features. Before dealing in detail with the frontiers of the new states, I would like to draw your attention to some of the main geographical features of this part of the world. I omit everything north of the Carpathians, as it seems to me that the latter form a natural frontier whatever be the arrangement of states.

Rivers. First, then, the five great rivers, Danube, Elbe, Theiss, Save and Drave, of which it must be remembered that the first two are international and not inter-allied. There is therefore no right of search. I suggest for your consideration that the Danube thus forms a good line of munitions supply from Regensburg to Odessa and Trebizond or vice versa.

All five of these rivers are, more or less, navigable for considerable distances: the Danube throughout its length in Austria and Hungary, the Elbe and Moldau to Wittingau, the Theiss to Csap (sometimes), the Save to near Laibach, and the Drave to near Marburg. In addition, the tributaries of the Danube and Theiss formerly served to bring down the felled timber from the Carpathians to the saw mills in Hungary.

Mountains. Next, the main groups of mountains: the Alps, the Carpathians and the Balkan mountains. In the main heavily wooded and the site of many mines. The watershed of Europe, by the way, is roughly on the line Linz-Oppeln, but these hills, the "Böhmisch-Mährische Höhe," are not striking when one sees them.

Special Features. Apart from the main groups of mountains, the following special features should be noticed:—

a. In the southern part of Austria, the only communications running east and west, whether from Graz, or even from Vienna, run along the valley of the River Mur and through Klagenfurt. This might have an important bearing on operations further south.

b. In Hungary, the militarily important range of hills running south-west from Miskolcz, via Waitzen and along the north edge of Lake Balaton to near Nagykanisza. These hills are fairly heavily wooded and full of stone, quartz, marble, &c., quarries. They run up to a height of over 3000-ft. whereas the Danube is less than 500-ft. at Budapest, and Lake Balaton under 350. They are, therefore, fairly steep and provide good defensive positions against any attack from Czecho-Slovakia, or, west of the Danube, against an advance from the south.

c. Again, in Hungary, the Alföld, or great Hungarian plain. This is very flat and presents no military obstacle except for the rivers and, in winter and spring, the mud. The latter is, in Hungary, a factor of prime importance, and, in winter or spring, the condition of the plain can only be compared to Flanders without the advantage of the pavé roads. In summer, the sunbaked condition of the land on the plains would enable horse transport and even lorries to pass practically anywhere.

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Thirdly, the railway communications radiating outwards in all directions from the two main centres of Vienna and Budapest. Lastly, the bottle neck containing the seaports of Trieste, Pola and Fiume—Zara, Cattaro, Spalato and the other ports on the Dalmatian Coast are comparatively negligible for commercial purposes.

It will thus be seen that the frontiers of the Austro-Hungarian Empire enclosed, speaking roughly, an economic basin with outlets to the northern end of the Adriatic and to the Black Sea via the Danube. The new states in this economic basin, i.e., Austria, Hungary, Czecho-Slovakia and Jugo-Slavia, have no outlet to the sea at all except via international rivers. In the former monarchy, the eastern agricultural half supplied cereals and agricultural produce to the industrial regions in Bohemia and Austria, and received in return the manufactured articles it had need of.

Present Situation on these Frontiers. Now, the situation on all the frontiers of Hungary and, to a certain extent, of Austria, is very strained. There is comparatively little interchange of goods. Even a farmer wishing to till his fields on the other side of an imaginary line, has to get a pass from the Provincial Governors of both countries; if he doesn't, he is quite likely to get imprisoned or shot. Sons can only visit their parents over the frontier with great difficulty and so on. Unless the position of affairs has greatly improved lately, you will find that there is a regular system of day outposts all along the frontiers and that, at some bridges, barbed wire entanglements block all traffic.

Some effects of new Frontiers. Austria has been deprived of nearly all her food producing area, whilst not only do many thousands of Magyars between Kassa and Bratislava (at one time the capital of Hungary) come under Czech domination, and more thousands in Transylvania under the Roumanians, but Hungary has lost most of her timber areas, her salt mines, her best horse breeding country, all her iron mines except one, and a considerable proportion of her factories and mills, and she has been partially "looted" of her thoroughbred stock, her machinery and even her private property by the Roumanians and others.

It is, indeed, easy to understand that it is difficult to persuade the people on the spot as to the permanency of the present frontiers.

Frontiers in detail.

Austria. To take these frontiers in detail, starting with Austria: the northern frontier has been fixed strictly ethnologically and I do not think there is very much to say about it. The main problems arise further north—on the Carpathians—as exemplified in the 1866 campaign.

On the west, the old frontier line with Germany is maintained. Salzburg, Tyrol and Vorarlberg are all strongly pro-German.

On the south, the Italians have gained the Trentino, with a considerable proportion of German inhabitants. The Austrian—Jugo-Slav frontier leaves several big towns, such as Marburg, with an

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Austro-German population in Jugo-Slavia, but the country inhabitants are Slav. It is noteworthy that the Slavs in the Klagenfurt basin voted for inclusion in Austria owing to better facilities for the disposal of their produce.

East of a railway junction called Spielfeld, the frontier here runs for 18 miles along the Mur river, and, cutting off the fertile "Abstallbecken" from its only markets and communications, forms an excellent example of the defects of a river frontier.

Burgenland. The only accession of territory gained by Austria, as a result of the war, is a strip of country now known as Burgenland, which formerly belonged to Hungary, on Austria's eastern frontier. The reasons for this transfer of territory are many and varied. In the first place, the inhabitants at one time desired to be transferred to Austria owing to the Bolshevists being in power at Budapest. Again, it was probably in the interests both of Italy and of the North and South Slavs to keep Austria and Hungary apart. No better means could be devised than to throw down a bone of contention between them. The transfer was carried out in December, 1921, after considerable difficulty and fighting between the Hungarian "bands" and the Austrian gendarmerie and troops. Finally, a compromise was arranged whereby the important town of Sopron at the south end of the Neu-Siedler See was allotted to Hungary after a plebiscite.

Sopron. Possession of this town (Sopron) and district, situated as they are, would have a considerable military value to Hungary under two sets of circumstances :—

either (a) as a jumping off place for an attack against Wiener Neustadt and the communications of Vienna with the south.

or (b) as a flank defence against any advance of the Czecho-Slovaks from their bridgehead at Bratislava down the right bank of the Danube.

South and west of Sopron the country is hilly and wooded with few communications, and, on the north and east, the town is protected by the Neusiedler See and by the marshy country running east from the south end of this lake towards the Danube near Győr (Raab).

Burgenland affords another example of a bad frontier : the foothills of the Alps run down into the southern part of Burgenland. Consequently, the communications of the district run east into Hungary. For instance, there is a railway from Szombathely into Burgenland, which stops at Pinkafeld. This is now cut by the frontier, with the result that the factories at Pinkafeld have had to close down and unemployment results.

Now turning to Hungary :—

Hungarian Frontier. Bratislava, also called Pressburg by the Austrians and Pozsony by the Hungarians, is in Czecho-Slovakia, and that country has a bridgehead south of the Danube at this point. Thence the frontier runs east along the Danube cutting off some

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hundreds of thousands of Magyars from Hungary, and, turning north just before the Danube makes its bend to the south, along the Eipel river, and what is really a spur of the Carpathians to Kassa. From Kassa, it turns E.S.E. along the valley of the Theiss, and it should be observed that the only railway in Czecho-Slovakia running east from Kassa lies at places within 2 or 3 miles of the Hungarian frontier. From Kassa right round by the east until it meets the Drave river, the frontier is purely artificial, across cultivated fields, and a glance at the map will show you how all the produce from the villages and farms and forests of these foothills and mountains are cut off from their natural markets. The population of these towns, Arad and Nagy-varad, is Magyar.

One disadvantage of this new frontier is that instead of 28 frontier railway stations, Hungary now has 51, the great majority of which require reconstruction to enable them to fulfil their new role. Further, the number of customs officials required to watch the frontier is far greater, for the surrounding states as well as for Hungary, than if the frontier had been established amongst the mountains.

Crossing the Danube at a point some 4 miles south of the port of Mohacs, the frontier runs between 2 small ranges of hills to the Drave river at Miholjac Dolni and thence up the river, splitting various properties between the two countries, to south of Nagy Kanisza.

Armed Forces. As regards the armed forces available for defending these frontiers, I have circulated a slip showing the strengths of the various forces last June, and I do not propose to go into details.

The Austrian Army is fairly well equipped, the Hungarian very badly. The morale of the latter army and its discipline are, however, excellent, in contradistinction to that of the "wehrmacht," which I have already referred to.

Apart from the regular forces, there are in Austria a considerable number of "Heimwehr" and "Arbeiter" battalions, both being political formations. These have a good number of rifles and possibly a few guns. Similarly, the Hungarian societies, like the "Awakening Hungarians," are organised and have got some rifles and machine guns.

Strategical Problems. I would now like to suggest to you two or three problems—purely hypothetical—of a strategical nature, dealing with imaginary situations in this part of the world.

It has been suggested that, putting aside the question of Bessarabia, the best line for a Bolshevist advance would be along the double railway line through Lemberg and Przemysl towards Krakau—the long narrow strip of country, called Slovakia, cuts off Hungary from its natural defensive and economic frontier of the Carpathians. Further, should Czecho-Slovakia desire to reinforce this strip of country, there is only one single track of railway available and, as I have said, east of Kassa this runs within a few miles of the Hungarian frontier. The Slovaks are not anti-Magyar. The question arises whether, in view of the possibility of a Bolshevist advance south-west across the Carpathians, before the Czechs could reinforce their troops in Czecho-

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Slovakia, it would be possible for the Hungarians to remain quietly with their small army on the plain near Miskolez instead of advancing across Slovakia to sieze the passes. Or would they wait for the Bolshevist forces to debouch from the passes and then fall back, fighting only delaying actions, to the right bank of the Danube in the hope of gaining time for the Allies to reinforce them. Personally, I am not sure that there is not a third solution preferable to either of the above.

Again, what would be the Jugo-Slav line of advance in the case of a "Little Entente" war against Hungary? At first sight, it would appear that an advance north between the Theiss and Danube rivers has overwhelming advantages. It would be easy to maintain touch with their Roumanian allies. There are no natural obstacles or defensive positions the whole way to Budapest. Navigable rivers, on which the Jugo-Slavs would have "the command of the sea," protect both flanks and provide auxiliary communications to the railways running north from Szeged and Szabadka. Also such an advance directly covers Belgrade. West of the Danube, on the other hand, there is a succession of hills and defensive positions where the Jugo Slav advance could be delayed. The Villany hills covering the port of Mohacs, the Pecs hills and others, culminating in that range to which I have referred, from Miskolcz via Waitzen to Nagykanisza.

Nevertheless, it is possible that Jugo-Slavia would select a line of advance much further west for three reasons :—

a. In case of trouble with Italy; it is 400 miles from Ujvidek to the Jugo-Slav-Italian frontier, and, in any case, a considerable Jugo-Slav force would have to be left to watch the latter.
b. In order to gain touch with Czecho-Slovakia and ensure a Slav corridor.
c. With a view to cutting Hungary off from possible arms and munition supplies from the west.

There is also the question of what effect a war in Thrace would have in this part of the world and many other problems, but I think I have said enough to show the interest that attaches to questions of this nature.

In discussing frontiers of countries from political and military points of view, it is difficult to avoid producing an impression of an alarmist nature. Because various wars, &c., have been considered in this lecture, it is not intended that it should be thought that they will necessarily occur. Apart from the financial aspect, the situation has undoubtedly improved in the last two years to a very great extent, and, if the hindrances to commerce, caused by the various countries and by the Reparations question, can be removed, there is no reason why the improvement should not be continued.

Conclusion. In conclusion, I would like to recommend you to visit these countries yourselves. Away from the capitals living is very cheap, and both sport and scenery in Austria are magnificent. The people in both countries are charming and distinctly pro-British.

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Winter sports in the Tyrol you have all heard of. Fishing (brown and rainbow trout) you can get practically all the year round. One of our fellows caught 70 between Saturday lunch and Sunday evening, one week-end—none very big but up to one pound. In addition to partridge, duck, geese and hare shooting, you can get stag and chamois, and houses (with shoots) were, until recently, very cheap to rent. As far as I know they are still, but Baron Franckenstein, the Austrian Minister, told me the other day that he had got a special secretary to deal with these questions, and, if you will write to him at 18, Belgrave Square, I am sure that he will not only give you any information you require, but do his best to help you in every way.

DISCUSSION.

General Sir W. Gillman: The lecturer has said that Fiume is in disrepair, and that the harbours south of it are negligible. I should like to know if the land-locked countries he has been describing are entirely self-supporting, or if there is any desire in them for external trade, and if there is how are they going to get it?

Colonel Gosset: There is a very considerable desire for external trade and a desire for access to the sea. That is one of the dangers of war between Italy and Yugo-Slavia, because Yugo-Slavia wishes to have Fiume as an outlet for her trade. Austria is not self-supporting, especially as regards food. Hungary is self-supporting, as I say, as regards the necessities of life. The difficulty about the ports of Zara, Spalato and Cattaro, is the Dalmatian mountains which render any proposal as regards railway construction very expensive to carry through. The only railways that I know to exist south of Fiume are narrow gauge railways. You will see railways marked on the map, but as far as I know they are all narrow gauge railways, and therefore they are not much good for commercial purposes.

The Chairman: It is left for me to sum up, I suppose. There is very little to say after the lecture we have listened to, but as I have been out in these countries perhaps I might say a word.

I think the saddest part of the whole thing in this burst-up of the Austro-Hungarian Empire is that after so many years of a really good administration from a German point of view, so much of these countries should have been swallowed up by people who are very much inferior in every way in civilisation. If you take Transylvania, it has been swallowed up by the Roumanians, and the Roumanians are not of the same class as what one might call Europeans. I met the President of the Council over here in London, before going to Roumania. He was all enthusiasm for the Roumanian cause. Before I arrived in Roumania he had resigned and when I met him again, he was declaiming against the old Roumanians saying: "They wish to swallow us, but they will find us very indigestible."

The Yugo-Slavs also were previously much better administered than at the present moment. The Bosnians and Herzegovinans feel that the old Servians are trying not to treat them as an ally joined up under one Government, but rather to exploit them.

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The people up in the north-east are Ruthenians. The nationality of people is a very difficult thing to find out. I used to have to go to the churches and see in what language the Litany was read, whether in Roumanian or Hungarian or German or Russian, in order to see actually what the nationality of the people was.

I found these Slovaks, *here*—(pointing to map)—were shouting for junction with their economic friends down *here*—(again pointing to map).—They wanted to send their wood down to them, and their harvests, and to carry on their ordinary economic life. The Czechs they had never even heard of. If you go there and ask a Slovak or Ruthenian what this Czech fellow is, he will say he is a "fiddler." If a Czech arrives in the town, they say there goes a "fiddler."

These men do not like a less civilised people; they do not like another race. That seems to me to be the saddest part of the whole thing. Hungary is shut up in the middle. All over Hungary is painted "Nem, nem, soha," which means "No, no, never." That is in their hearts.

These Hungarians are really men. Right down to the lowly peasant they are really men. They are the nearest thing I have met on the whole of the Continent to the British nation. As the lecturer has said, Admiral Horthy is one of the finest men one could possibly meet. He is the only man who, in all these dealings I had with them, never told me a lie over the question of the various frontiers.

These are only a few small points. The lecturer has given us a very good idea of these two countries. They are charming people and very hospitable. It is very cheap to go there, and you can make a a very cheap journey, far cheaper than going to Brighton for say a week.

In your name I would like to thank the lecturer very much indeed for all the trouble he has taken, and for all the information that he has given us.

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LONG GUNS OF THE FRENCH HEAVY ARTILLERY.

L'artillerie lourde longue—Lieut.-Col. MUSSEL. *Revue Militaire Française.* Jan., 1923—Feb., 1923.

PART TRANSLATION

BY

BRIG.-GEN. W. EVANS, C.M.G., D.S.O.

(with map).

Abbreviations used:

A.L.G.P. Artillerie lourde à grande puissance.
A.L.L. Artillerie lourde longue.
155 G.P.F. 155 Canon long à grande puissance (Filloux).
R.G.A. Réserve générale d'artillerie.

PART I.

IF guns really had the souls with which artillerymen credit them they would feel hurt at the ingratitude of man.

Although it is less than four years since the war, the remembrance of the heavy barrages that covered the soldiers with a thick advanced guard of shell, is fading.

Man, ever forgetful will soon claim that his own cleverness and heroism was all sufficient.

This ingratitude towards the machine is a fact borne out by history.

The guns of Jacques Galiot at Marignan are forgotten: the charge of Francis I's gendarmerie was considered to be the cause of success. Marmont's guns at Castiglione, at Marengo, Senarmont's batteries at Friedland, Drouot's at Wagram and Hurtebise are barely mentioned. Some go so far as to say that Napoléon's downfall synchronised with the augmentation of his artillery.

However, after the battle the guns are silent, and people forget all about them.

The 75's are too closely bound up with the front line to be forgotten immediately. In any case this article is not concerned with the Field Artillery, but with a branch less seen, i.e., the *Artillerie lourde longue.* As the A.L.L. only worked indirectly for the infantry the latter took no interest in it. Many of the officers despised it, accusing it of not being in the battle, and of performing monkey tricks —such as problematical harassing fire, and doubtful counter battery shoots, for the sole purpose of adding to their researches in ballistics.

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Perhaps I may be pardoned if I lift the veil of oblivion for some of the A.L.L. groups.

I. 1916-1917.

Take the groups of 145/155 and the 155 L à grande puissance Filloux (G.P.F.)

When the first group arrived at the front it caused quite a scare. Marine guns had been seen, but these were few and far between and reserved for the personal use of Army Commanders. " I can still see Col. Y. saying to his friend Col. X. " I have just received a group of 145, how the deuce do you use them? Pooh! says Col. X. surrounding himself with a smoke screen with the help of his pipe. Its only a 155 that shoots a bit further than the others, that's all."

Now don't let us make any mistake about Col. X, he was a fine fellow and quite up to the 1916 standard of artillery colonels. He looked to the 75 as his principal weapon, and can't be blamed for so doing.

Suppose in 1897 you had told a man accustomed to pointing out the target to his subalterns in the open, and commanding by voice a short distance from the guns, to direct his fire from an O.P. miles away, people would have thought you optimistic to say the least.

One cannot be surprised that officers already busy enough fighting, weren't very quick to see the possibilities of new weapons.

Be that as it may, these guns were at first almost entirely used for harassing fire or retaliation. " Hullo—the Boche has just fired four rounds at Corps headquarters—let off four rounds as quick as possible at Vieilleville (Corp. h.q. boche) . . . . no *five* rounds." Well well!

And so we see that during the years 1916, 1917 the work of heavy artillery (A.L.L.) groups was without glory, and often without profit.

Separated from their own C.O.'s—(Regiments being split up wantonly) isolated groups were often treated as " poor relations." The soundest suggestions, based on the proper use of the guns, a use known only to their own officers, were often attributed to "stickiness," if not to cowardice!

For instance a group commander who expressed quite justifiable doubts as to the capacity of a temporary bridge was severely told by a young staff officer to get his guns over first, and see if it was up to their weight afterwards.

Now if he had tried to cross without taking precautions and had broken the bridge, the whole supply system of an Army Corps would have been stopped.

The local commander always had the same excuse; certain of these groups had been given to officers who knew nothing of the ground, and there was good reason to mistrust their habit of exaggerating difficulties. If then in future groups have to be improvised in the middle of a war it would be as well to put them under officers on whom the local command could rely, and whose opinion would carry weight.

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In spite of this general misuse of the guns, 1917 saw undoubtedly great progress in artillery technique. Officers of the A.L.L. groups began to recognise that taking the long range into consideration, and the difficulty of ground or aerial observation at great distances, they must restrict their zones.

So the best of them commenced to work on lines that hitherto had been thought to be only suitable to A.L.G.P. This procedure was simplified by putting the tractor-drawn artillery and the A.L.G.P. under the same commander, and by the encouragement of the Generals of the R.G.A.

These technical methods spread rapidly. All the artillery adopted new methods, which were embodied in the training manuals, and superseded the old methods of fire in the field.

Thus every artilleryman had a complete guide to enable him to suit his methods of fire to existing circumstances.

Tactics in general were greatly influenced. The High Command could now change their artillery preparation. The long artillery preparation by registered guns could be dispensed with and thus the factor of surprise obtained.

II. 1918.

" Man is an apprentice, sorrow is his master " says the poet. . . .[1]

It was in the dreadful retreats of the spring of 1918, that the proper use of long guns with tractor transport was learnt. Instead of making them carry out feeble shoots at many targets, heavy concentrations were asked of them.

Circumstances made it necessary to retain the A.L.L. in big groups under the orders of their proper commanders.

The results attained thereby were a revelation.

In this connection it is a curious fact that the Germans never concentrated their 13 c.m. and 17 c.m. long guns into important tactical groups.

In 1916 during the Somme offensive I commanded a group of 100 T.R. in action near Fay, in the big ravine that runs from Proyart towards Barleux through Chuignolle, Chuigne, Fontaines-les-Cappy, and Fay.

This ravine was crammed with dumps, artillery, infantry cooking places, &c.

Two hostile 13 c.m. guns fired into this sector, two more towards Foucaucourt, two others further North shot into the Somme valley.

Its true these guns were a great nuisance. They murdered people crossing the bridge at Cappy, at the cross-roads at Fontaine-les-Cappy, at the sugar factory at Dompierre . . . but caused very few casualties and the moral effect soon became negligible. Moreover as they carried out their series on a similar programme every day, one was able to arrange to bring up ammunition and supplies when

[1] "Qui connait la douleur a beaucoup appris." Chanson de Roland.

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they weren't firing. Imagine these guns concentrated and properly handled and their ammunition saved for important occasions.

If concentrated fire sweeping the Fay-Chuigne ravine had been made use of when the French attacked Barleux, casualties would have been increased a hundred fold and supply seriously interfered with.

Col. Mussel now gives a technical explanation of the methods of employment of the A.L.L. It is hardly necessary in writing for gunners to touch on the various methods of getting range, line, &c., which are similar to our own. The principal features of the guns are as follows :—

145/155 L. Range about 18,000, small traverse, but has an improvised platform easily carried which allowed the line to be switched through 90° in 10 minutes. It took about an hour to get into action (including digging a small ditch) and about ¾-hr. to get out. Quickest rate of fire 3 rounds in 2 mins.

155 G.P.F. (155 Canon long à grande puissance—Filloux). Range about 18,000—takes much longer to get into action as a big recoil pit has to be dug. The split trail gives 60° traverse. It takes on an average an hour to get out of action.

These guns cannot be fired at low elevations, therefore the ground for about 7 kilos from in front of their muzzles is not covered by their fire.

PART II.

Retreat from the CHEMIN DES DAMES to VILLERS-COTTERETS.

On May 27th the, the nth Regiment, whose working parties were organizing positions on the front Carlepont-Aumont (S. of Mondidier) was warned to be in readiness to move and concentrated about 9 p.m. W. of Crépy-en-Valois.

On May 28th four groups left for the Soissons area to join the VI Army.

The Colonel who arrived at Chaudun at 8 hrs. reported himself to the nth Corps. staff at Billy-sur-Aisne. He had learnt on the way of the break through of our line at the Chemin des Dames and expected to come into action behind the Vesle.

The first deployment was expected on the line Point 94 (E. of Soissons) Mont-de-Soissons.

Corps. orders were distinct and information regarding the enemy got from the staff, appeared most convincing.

However nothing comes up to a reconnaissance, and one cannot be too thankful that regulations insist on it. The Commander of the regiment actually found groups of French infantry in full retreat, beaten and disheartened, and German machine guns not too far off.

In returning to report this he was most uneasy. How would he be welcomed? Would they believe him, or would they insist on orders being carried out that would lead to the profitless capture of the groups. Besides what tasks would they ask of them.

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Fortunately the heavy artillery commander of the nth Corps., was a very experienced senior officer, who knew the ground, the capabilities of his guns, and how to use them.

Formerly an officer of the A.L.G.P., a distance of a kilometre more or less from the front line appeared to him of small moment with guns ranging up to 17 or 18 kilometeres, while that kilometre might allow of the guns being got into action, and ample preparations for accurate fire made. He also knew the value of concentration of fire, the normal procedure of the A.L.G.P.

The Heavy Artillery Commander and the Regimental Commander at once found themselves entirely agreed on the following points:

When one retreats as the result of a surprise like that of the Chemin des Dames, great disorganization occurs during the first few days; the air force and the balloon sections are falling back, and liaison with them becomes most difficult, for they are constantly changing their aerodromes. Their work is much interfered with by the numerous enemy aircraft.

Moreover one knows nothing or next to nothing of the enemy artillery, so little can be done to counter the hostile batteries.

As for fire to block localities (*tirs d'interdiction*) except in the somewhat rare cases of where the enemy is obliged to pass some known obstacle, a ravine, river, &c. . . . one is uncertain as to the line of march of the enemy columns. In any case, one does not know *when* they pass such obstacles, for want of information from the air.

The only possible objective, and that the most dangerous at the moment and of most importance was the *enemy infantry*. Besides this one had to reckon on the losses in field artillery and to foresee what would be required of the A.L.L. to supplement the artillery of direct support. Consequently, taking into consideration the time necessary to get the guns into action, the amount of uncovered ground (7 to 8 kilos.) in front of the 145 and the G.P.F., and the necessity to effect concentrations of fire with comparatively *slow firing* pieces, and the constant advance of the enemy, it was necessary to put one's pride in one's pocket and keep the guns well back.[1]

The task of the groups might be said to be: "While taking every opportunity of engaging the German artillery, or his columns on the march, to occupy and maintain positions to engage infantry attacks, either by reinforcing the field artillery, or taking its place."

Let us now examine the rôle of the Heavy Artillery Commander of the Army Corps. As the retreat of the Corps. was on a 12 kilo. front, the heavy artillery commander, often forced to remain close to Corps. headquarters, could not always give *actual orders* for the withdrawal of his groups. He had therefore to content himself frequently

[1] It is even probable that it would have been more profitable to establish oneself . . . . with all the fresh troops on a line to *be held at all costs* (ligne d'arrêt) submitting to the sacrifice of ground necessary to ensure having time to prepare a good system of fire. The retreating troops would have been rallied behind, and one would have held the Germans on this line. Instead of this the fresh troops seemed to us incapable of filling the gaps, and became imbued with the moral depression of the retreating troops from the start. (Note by an eye witness).

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with sending *instructions* to his colonels, and to trust them to carry out urgent shoots, or with the withdrawal of individual groups.

Similarly it was the duty of commanders of groupings to keep in touch with him, to keep him informed of the situation on the wide and unstable front, to enable him to see the general situation clearly and make his deductions therefrom.

I may say that this mutual confidence proved very valuable in conditions so exceptional with guns of this nature. Thanks to his perfect knowledge of the ground, the instructions, and sometimes the orders of the H.A. commander were accompanied by practical hints of great value. As for the commander of the 'grouping' we are concerned with, his first ideas may be summed up as follows:

Appreciation of the situation:

1. In his first reconnaissance it appeared to him clear that the density of the French infantry diminished rapidly on leaving the Aisne. He therefore concluded that in the course of the retreat, the right would be the moving flank, and that a break through from a flank which might cause the loss of guns, would occur almost constantly from the south-east.

2. The natural *points d'appui* where the infantry could rally, with the left covered by the Aisne were first laCrise, then the line of villages and woods parallel to the Chateau Thierry Rd.: Bellevue, Buzancy, Villemontoire, Hartenne-et-Taux, Oulchy-le-Château, and immediately in rear Parcy-Tigny, Plessiers-Huleux, Oulchy-la-Ville. Finally the line Pernant, Dommier, Ruisseau de la Savière with an advanced line Missy-aux-Bois, Ferme Beaurepaire, Villers-Hélon, bois d'Auvray, Buisson de Hautvison, Chouy.

Conclusions:—

1. First deployment on the general line: Fme. Cravançon, Vilers-Hélon, Oulchy-la-Ville, *groups of 105* on the right, and extreme right. These horsed groups should assure the withdrawal of the tractor drawn guns, on account of their superior mobility, and as they could shoot at shorter ranges, they could keep up their fire longer.

Moreover their quicker rate of fire made them suitable to flank the line of guns.

From the point of view of *information*, these groups of 105 could be pushed up, or left nearer the front line, and so with their mounted patrols could obtain timely information about the situation on the critical right flank.

2. To get into touch as quickly as possible with the situation of the two infantries. Now to remain with a unit of infantry, even a big one, was to cramp one's view of the situation as a whole, and made you risk losing touch with the groups directly an alteration in the local situation should occur.

Hence to establish the first command post towards the right and far enough back to ensure telephonic communication for as long as possible.

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The P.C. linked to Divisional Artillery, and to the Infantry Divisions if possible.

A permanent wireless station to receive the demands of the infantry.

To send officers in cars, on motor-bicycles, or cycles up to the infantry.

Finally full use to be made of the air.

3. *Despatch of Orders* for series in good time. Great initiative necessary. Six days and nights battle experience showed that the Corps. often received information too late to order useful shoots. Series were of two natures.

(a) Fire of a group on well defined objects, village, wood, batteries; the O.P's in the Bois d'Auvray allowing of registration.

(b) Heavy barrages (tirs d'arrêt) to help the infantry.

These entailed a great deal of preliminary work.

The commander of the ' grouping ' had to study to begin with—and as far as possible by seeing the ground—the *points d'appui* so as to know the approaches, and points of assembly likely to be used by the enemy. For each rallying point, a small zone was allotted a number, the number usually followed by several letters, and the groups had to be prepared to open fire on all these zones.

For example, Parcy-Tigny numbered 22, had two letters *a* and *b* corresponding to two possible attacks; one debouching from E, assembly point valley S. of Tigny, reserves in woods of Hartennes-et-Taux, Tigny; the other debouching from S.E.

Finally, the air, besides controlling series being carried out, could demand others, which must be complied with.

Orders were sent by:—

(a) Telephone.
(b) Despatch riders.
(c) From May 31st (incl.) by wireless.

4. *Rear positions.* By occupying at first positions 7 to 8 kilos. from the line,* groups can comfortably follow the fluctuations of the fight, advancing or retiring by echelons as the situation demands, without interruption of fire, and without letting the enemy penetrate into ground they cannot cover with fire. One may add that counter-battery work on the 77, 105, 15 c.m., and 21 c.m. supporting the enemy attack is quite possible, as most of these will be well within range.

It is no use moving these guns less than 7 or 8 kilometres at a time. The following example is typical. A group of G.P.F. came into action 4 kilos. from the line; hardly had the recoil pits been dug, when it had to retire without having fired a shot. The last gun got

* Commanders of *grouping*, and *groups* must be much nearer the line to be in touch with the fighting.

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away after the field artillery had gone back, with the Germans within 600 yards.*

The second position was only 4 kilos. further back, and the same thing occurred again.

Now if the second position had been occupied from the start, the group could have fired quite usefully on German infantry. Working parties should have gone back at once and prepared platforms, and the group could have retired by echelons, and fire could have been kept up throughout.

SUMMARY OF EVENTS AND SERIES FIRED.

On May 29th at O hrs. (28-29 night) groups were in action ready to open fire as follows:

1 Group 145 near Cravancon Farm.
1 ,, 155 G.P.F. Bois d'Auvray.
1 ,, 155 L. Bois d'Auvray.
1 ,, 145. nr. St. Remy Blanzy.
2 ,, 105 in front of Billy-sur-Ourcq.

Command post of *grouping*. Villers-Hélon, Corps H.Q. moving back to Longpont (from Ecury).

When day broke it was found that a very extensive view of the Soissons area could be obtained from the Bois d'Auvray.

From there numerous fires were seen towards the East—villages, petrol dumps, huts. The fires appeared to be spreading towards the South.

Convoys in orderly retreat on the Villers-Hélon Louâtre road.

Officers' patrols in light cars were sent towards Parcy-Tigny and Plessier-Huleux.

Concentrations commencing in the morning ordered on the Crise ravine, Chacrise area, Ambrief, Ecury (own Corps. H.Q. till 6 p.m. 28th).

(i.e. at targets behind the positions first allotted to the grouping).

Towards 15-hrs. a heavy concentration on E. edge of Hartenne-et-Taux wood, to supplement the fire of the field artillery, stopped an attack on Tigny and Parcy-Tigny. It was interesting to see a German battery in action N.E. of Hartennes destroyed in a few minutes by one of the groups, who took it on, on regular field artillery lines, one battery ranging on it, and the other joining in when the range was found.

* * * * *

MAY 30th.

The same positions up to 18-hrs.

One series is worth recording. About 13-hrs. the wireless listening station reported that the infantry demanded urgently a barrage (tirs d'arrêt) in front of Parcy-Tigny and Plessier-Huleux. The field artillery did not appear to be able to comply.

* This example is borrowed from another front. Only the gallant behaviour of a section of Zouaves enabled the last battery to be safely withdrawn.

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Fire was opened by several groups—shoots 22a, then 22b, in front of Parcy-Tigny—23a in front of Plessier Huleux alternately. Towards 14-hrs. 30 an infantry doctor who met one of the group commanders at Villers-Hélon said " Ah! that was good work. We demanded in vain a barrage of 75's, and got a concentration of heavies. It stopped the Boches at once."

Gen. von Winkler has remarked on the strong resistance met with on the 30th on the line Parcy-Tigny—Grand Rozoy. Perhaps one is justified in thinking that the heavy artillery, both by its moral support to the infantry, and by the moral effort of its big high velocity shell, was an appreciable factor in this resistance. In spite of this, towards 19-hrs., the progress of the Germans obliged the groups, except the most northern one, to fall back on Vouty-Chouy—one battery G.P.F. remaining however at the Bois d'Auvray. The 105 groups only fell back 2 kilos. once the tractors had moved.

The Command Post moved to Louatre, still near the O.P's in the Bois d'Auvray.

MAY 31st.

All the groups were ready to open fire before dawn. An urgent shoot at Villemontoire (ordered by Corps.) was most efficiently and quickly fired by one group.

* * * * *

About noon, the progress of the Germans demanded a further retirement.

The 145 northern group to Dommier.

southern ,, in front of Oigny.

The advanced G.P.F. battery joined the other E. of Dampleux.

The group 155 L. remained at Vouty.

The 105 groups towards Vouty and Faverolle respectively. P.C. at Faverolles.

(Arrangements for close defence made 400^{M} in front and on the right front of the guns, mounted patrols W. of the Savière, cyclists on the river, and officers patrolling out to the infantry line Ancienville Corcy-Longpont, &c.).

JUNE 1st.

The Germans were on the Savière. The G.P.F. group remained for the time being at Dampleux.

S. group 145 to S.W. of Oigny.

Group 155 L. at Vouty had to retire at 13-hrs. after the field artillery.

The Germans took Vouty and Faverolles during the afternoon (shortly after the P.C. had left for Dampleux).

Towards 14-hrs. a general retirement covered by the two 105 groups between Oigny and Dampleux, to the area Pisseleux (105), Villers-Cotterets, Largny, Vez.

It would have been better to have moved back commencing on the morning 31st, the southern 145 group, and the whole of the G.P.F. group to W. of the Savière, and the 105 groups towards Maucreux,

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as large bodies of German infantry had already got into the ground uncovered by the fire of several batteries. Finally the dispositions of the evening 31st May, and morning June 1st were lacking in *depth*, which was a nuisance seeing how close the Germans were, and with the forest of Villers-Cotterets close by. On the afternoon of June 1st the G.P.F. group might have been captured, if the Germans had not stopped halfway between Vouty and Dampleux, held up by a few men of the 168th Regiment of Infantry.

JUNE 2nd.

The area Dampleux-Oigny was nearly empty of field artillery and infantry when at last the 46th R.A.C.P. and 128th Infantry Division arrived.

On June 3rd this division retook Vouty-Faverolle pushing the Germans back to E. of the Saviére.

The heavy 'grouping' supported this counter-attack.

The Germans were stopped on the Savière.

Col. Mussel next deals shortly with the periods : June 3rd, 1918. July 18th—August 11th, rather more fully. August 11th—September 25th.

September 25—Armistice, all illustrated by maps.

Of these periods I translate that from July 18th—August 11th as an example of the work of a 'grouping' of A.L.L. in an advance.

PERIOD JULY 18th—AUGUST 11th.

After the retreat from the Chemin des Dames to Villers-Cotterets we appeared to attach little importance to series fired to deny localities (*tirs d'interdiction*), considering that when the enemy has freedom of manœuvre, one is in the dark as to *when*, and *where* his forces are advancing . . . . . In attack, however, the *where* is known, and the *when* cleared up by aerial observation, so these series have great effect.

Similarly *harassing fire* which seemed to us unnecessary in calm sectors, may have good effect after a successful attack. A few well placed shell in the vicinity of an important command post, may give the enemy a moral excuse for clearing out.

It will be remembered that during the retreat from the Chemin des Dames the O.C. Corps. Heavy Artillery had to leave much of the initiative to commanders of 'groupings.' In the attack on the other hand he could centralise.

It stands to reason that if a very rapid advance takes place, it again pays to decentralise, giving a free hand to commanders of 'groupings,' and even handling over the 105's to the Divisions in the front line.

ATTACK of July 18th.

Grouping under consideration :—

2 groups 145L.

3 groups 155 G.P.F.

1 Armoured train of 19.

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Except for 1 group G.P.F. marching behind the 20th Corps., the 'grouping' was attached to the 11th Corps., though the 20th could call on it for certain tasks. There was no Army artillery.

At the moment of attack, which took place without artillery preparation, the 'grouping' commenced counter-battery work. The historians of July 18th hardly mention the counter battery work.

They attribute the whole success to *surprise*, and the action of *Tanks*. This is far from being true. Even if the hostile batteries near the front line were so taken by surprise that they never fired at all, this was not so with guns 4 and 5 kilos. back, about Chaudun, Villers-Hélon, Villers-le-Petit.

The fact that these remained mute was undoubtedly due to good counter battery work.

The batteries at Villers-le-Petit in particular, were absolutely knocked out and could do nothing to stop the 11th Corps. advance from the S. of the Buisson d'Hautvison. Following the immediate success of the attack, almost all our artillery moved forward. Although the capture of nearly the whole of the German artillery allowed this, it was most unwise for it would never have been possible to supply our foremost guns, if the Germans had counter attacked.

"What would have happened, in the event of a counter attack, with our batteries on the move and no ammunition for our guns" (Gen. Franiatte, G.O.C. R.A., 10th Army). A proper plan for the artillery advance would have been useful. So far as the A.L.L. 'grouping' was affected the following might have been the scheme :

"To preserve some depth, first pushing forward the 145's (whose narrower track made blocks less likely, which can be got into action quicker, but whose traverse is small) with the object of reaching as soon as possible the following objectives : Bridges over the Aisne about Soissons, railway bridge S. of Soissons, cross-roads Hartenne-et-Taux. Cross-roads W. of Grand Rozoy, Oulchy-le-Chateau.

After this first move the locations about 10-hrs. on 18th would have been :—

2 groups 145 on the W. bank of the Savière about Javage-Maucreux.

3 groups 155 G.P.F. remaining in action ready to open fire on any counter attack.

2nd bound. Once the Field Artillery had crossed the Savière, i.e. when the G.P.F. could cross without causing blocks, to move forward by groups towards the Bois d'Auvray, Villers-le-Petit, LaLoge.

3rd bound. Once Fontaine-aux-Chênes, Plessier-Huleux, Géroménil Fm. were in our hands push the two 145 groups as far E. as possible to open fire on the cross-roads of Fère-en-Tardenois and the bridges over the Vesle ; move the G.P.F. to the line Blanzy, Billy-sur-Ourcq, &c.

What actually happened was that on July 19th all the groups were *in one line on the Savière*. During the night of 20th one group G.P.F. went to Villers-le-Petit. 21st night 1 group 145 at the Fme.

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d'Edrolle fired a series at the central cross-roads at Fère-en-Tardenois, in conjunction with series by the 81st Regt. of Artillery further south.

These and aerial bombardments, prisoners stated, completely blocked the locality and prevented the relief of an exhausted division. From 22nd to 25th the second group of 145's and the two G.P.F. groups came into action behind Géroménil Farm.

From there they fired numerous series.

The following report by the Air Commander of the 11th Corps. shows some of the results :—

On July 24 1918, balloon reported to the heavy artillery an enemy convoy spread over several kilometres marching from . . . . (S.E. of Cramaille). The heavy artillery opened fire, and observers from two balloons reported excellent results.

Lorries, which undoubtedly contained ammunition were set on fire.

Fires were caused along the ground bordering this road where the Boches had established many small dumps. During the whole afternoon, small dumps of ammunition were burning, and small explosions occurred all along the road.

The air further reported destruction of ammunition at Saponay, Beugneux, bois d'Arcy and finishes thus :—

All these explosions and fires caused by our heavies must have hampered the enemy very much in carrying out reliefs, and in supply of ammunition.

Balloon observers are convinced that their action greatly assisted our infantry, for the German artillery fire was negligible. There is every reason to believe that this was due to lack of ammunition this having been destroyed by the excellent shooting of the 11th Corps Artillery.

It may be added that Ludendorff in his *War Recollections* (page 541 of the German edition) remarks on the considerable difficulty in carrying out reliefs, and supply on the Vesle, due to the fire of the French H.V. guns in the Soissons area.

These examples may serve to show the infantry that there are other natures of artillery fire beyond that of the field guns, and which moreover have the greatest influence over the battle, though their action is not seen by the troops in front.

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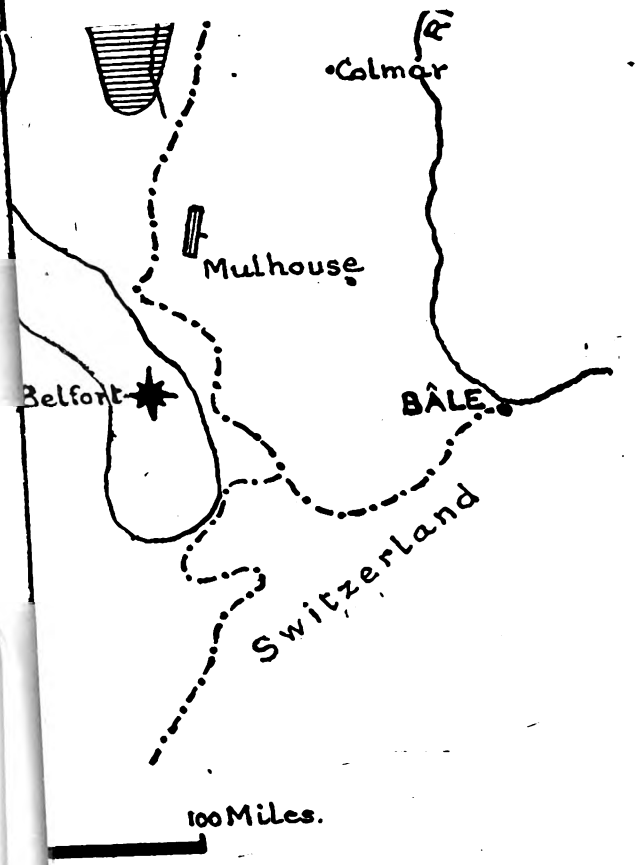
[See page 17.

AUGUST



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THE FRENCH PLAN OF CONCENTRATION AND THE COLLAPSE OF AUGUST, 1914.

BY COLONEL W. A. MACBEAN, LATE R.A.

PART II.

12th August.

Joffre, at last yielding to Lanrezac's insistence, authorizes the movement of the 1st C. to Dinant, to guard the passages of the Meuse between Givet and Namur.[1]

The French concentration is completed, except 19th C., Colonial Corps and Morocco Division.

The 2nd C. is now handed over by 5th A. to 4th. In exchange, the 5th A. is to receive the 19th Corps, from Africa, which is to assemble about Chimay.[2] It is only fair to G.Q.G. to point out here that the B.E.F. 1st and 19th C. and Valabrégue's divisions are thus designated to operate between Sambre and Meuse.

13th August.

1st C. marches for Dinant.

G.Q.G. issues the executive order for the advance of the 1st and 2nd A's.

The German positions in Lorraine, in preparation since the beginning of the month, follow the crest of a series of low heights, extending E. and W. from near Delme in the west to Phalsbourg in the east, and directly bar the approaches from the line Lunéville—Grand Couronné. Opposite the centre of the positions a tract of marshy wooded country, dotted by lakes, and extending for some ten miles, breaks up the front of attack into two sections. The eastern section has a frontage of 15 miles between the Vosges and the marshes, and Strasbourg is one march distant from the right flank. The western section, between the marshes and Delme, has a frontage of 16 miles, and Metz is a short march distant from the left flank. Thus the two French armies, advancing one on each side of the marshes, must make a purely frontal attack and cannot support each other. They are also in the dilemma that they cannot win their battle until Metz and Strasbourg are invested, and those fortresses cannot be invested until the battle is won, and so the matter goes round in a circle. The German dispositions here are admirable.

As regards the rest of the front, the impression of G.Q.G. about this time seems to be that the enemy, by his manœuvre in the north, is over-extending his front and is opening chances for the rupture of his centre by a French offensive in the Ardennes, and that those enemy forces which have so far crossed the Meuse below Liége, consisting principally of cavalry, are engaged in a raid directed upon the sea bases of the B.E.F.[3]

[1] Lanrezac, p. 72.
[2] Ibid, p. 73.
[3] Hence the arrangement of d'Amade's territorials *en cordon*.

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At the same time, that there is a great hesitation and uncertainty at G.Q.G., is shown by Special Instruction No. 6, addressed to 3rd, 4th and 5th A's. Evidently there is complete ignorance as to the enemy in the Ardennes[1]—he may be near and may be distant. Thus, the directive commences by saying that the armies which are to be ready by the 15th may not have time to attack beyond the Semoy and Chiers, and in this case they are to counter-attack the enemy if he appears. On the other hand, if the enemy should be still distant the 4th and 5th A's are to be ready to advance through the Semoy defiles, while the 3rd A. is to be ready to advance or to face towards Metz.

Who is to decide whether the enemy is near or distant is not stated. The G.S. again fails to practise its doctrine regarding the offensive.

At this time the 3rd Army states that it has identified three German corps opposite to it.[2] Correct, so far as active corps are concerned.

14th August.

Belgian troops at Huy and Andenne are withdrawn owing to the presence of large enemy forces on the opposite bank of the Meuse. The II, III and IV C. cross the Meuse at Visé.[3] French cavalry in the Ardennes[4] report enemy troops marching from Marche and the N.E. on Dinant, apparently forming the advance guard of an army.[5]

Lanrezac, more uneasy than ever, goes in person to G.H.Q. to represent the German threat by the left bank. Joffre and his staff reply in chorus: "We feel that the Germans have nothing ready there."[6] Returning to his H.Q. Lanrezac finds a G.Q.G. Intelligence Report to the effect that the German group in Belgium, comprises the III, VII, IX, X, XI, XIX and XX C. echeloned from Liége to Neufchateâu and *directed towards the Meuse above Namur*,[7] with the Guard C. in second line. The Luxemburg—Thionville group comprises the VIII, XVI and XVIII C. He writes to G.Q.G. requesting that he may be allowed to prepare for the movement of his army to the Maubeuge—Givet rigion. Berthelot[8] assents, 6.20 p.m., but adds that the threat is still remote and uncertain.

The 1st and 2nd A's commence their advance.

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[1] See G.Q.G. telephone message to 4th A., 17th August.

[2] "La bataille," p. 75.

[3] Bulletin Belge, August, 1920.

[4] 3rd C.D. of Cavalry Corps.

[5] "Le secret," p. 427.

[6] Lanrezac, p. 77.

[7] "La bataille," p. 78. Writer's italics. At this time Lanrezac does not yet realise that the Germans intend to operate by the left bank of the Meuse-Sambre. G.Q.G. still believes that the German right will march on Mézières.

As to the report, the II C., part of which had been identified at Liége on the 7th is now omitted. The XX C. is on the Russian front. Otherwise the corps mentioned are correctly identified.

[8] Head of the operations section, G.Q.G.

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15th August.

At 8 a.m. G.Q.G. telephones Lanrezac authorizing him to prepare to move two more corps, in addition to the 1st, to the north, but that the movement is to be carried out by order of the C.-in-C.[1]

At 10 a.m. G.Q.G. issues a special instruction (No. 10)[2] to the 5th A. to the effect that the enemy appears to be making his main effort N. of Givet and that another group seems to be marching on the front Sedan-Montmédy-Damvillers. The 5th A.[3] is to move to the Marienbourg or Philippeville district to act in concert with the British and Belgian armies—For Sordet's Cavalry see p. 13, April Journal.[2]

At 1 p.m. the 1st C. repulses an attack on Dinant. Enemy infantry are found entrenched behind the Lesse, by Sordet, in the afternoon. . .

" But during the afternoon of the 15th, news came (to G.Q.G.) that 200,000 Germans were crossing the Meuse below Visé."[4]

The intelligence staff at the War Office telephones[5] to G.Q.G. that (enemy) forces are continually arriving behind the line Liége-Maestricht-Venlo[6]. . . . . and that compact masses occupy the Liége district.[7]

At 7 p.m. Berthelot telephones 5th A. to carry out the movement of the two corps northward.

At 2.35 p.m. Joffre addresses a note to Sir John French.[8] After repeating the information regarding the enemy given in Special Instruction No. 10, he explains that the mission of the 5th A. is to act in concert with the British and Belgian forces.[9] While as yet it is impossible to determine the exact form of the manœuvre, the general idea is that as soon as ready, i.e. about (*vers*) the morning of the 21st,[10] the British army is to move N. of the Sambre, about Rouveroy and Harmignies, with a view to marching in the general direction of Nivelles, either on the left of the 5th A. if the whole force moves north, or echeloned on the left of the 5th A. if the direction of its march is bent more to the east . . . . . " As regards the co-operation of the Belgian

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[1] "La bataille," p. 80.

[2] Ibid, p. 81.

[3] The 2nd C. has already joined the 4th A. The 11th C. and 4th C.D. are now also to join that army, with 2 reserve divisions. In exchange the 5th A. receives the 18th Corps from 2nd A. and the 19th Corps, also 3 reserve divisions. On balance, the 5th A. exchanges a cavalry division for a reserve division.

[4] H.G.W. I p. 37. It will be noted that if the times given are correct, it is not apparently this message that G.Q.G. acts upon when issuing Special Instruction No. 10.

[5] Hour not stated.

[6] 40 miles N. of Aix.

[7] "La bataille," p. 80.

[8] "La bataille," p. 82.

[9] The positions of the corps of 5th A. are given—1st C. Dinant, 3 corps marching on Philippeville, 1 corps to detrain S. of Maubeuge on 20th.

[10] The concentration was virtually complete on the 20th. H.G.W. I, 6. 48.

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army, it would be suitable (*il conviendrait*) to request it to . . . . . act on the German outer flank."[1]

The greatest strategic error of all remained to be committed, and G.Q.G. commits it. The 5th A. is dribbled forward into the terrible salient between Meuse and Sambre, with the B.E.F. on its left. To attempt to concentrate the scattered fractions of an army in the direction of an advancing enemy is one of the most dangerous operations of war.[2]

To turn for a moment to the Belgian army. Apparently G.Q.G., while mentioning Belgian co-operation, does not even know where the Belgian army is, nor what its intentions are. No real attempt has so far been made to combine its operations with the French and British forces, nor will any real attempt be made. The fact is that G.Q.G. does not believe in Belgian co-operation, for Lanrezac, writing to Joffre on the 14th, says: " We (i.e. he and Joffre) agreed (at their interview that day) how little Belgian co-operation is to be depended upon."[3] Also Colonel Brécart, sent to Brussels on 5th August, has reported unfavourably on the Belgian army, and says that, while it is impossible to say what use the Belgian Government will make of the army, his impression is that the eyes of the Belgian command are turned towards Antwerp.[4]

Hence the Belgian army cannot be counted upon to delay the force of 200,000 Germans, about six corps, which crossed at Visé on the 15th, and which can march direct on the Sambre.[5] From Visé to Floreffe, via Tirlemont and Jodoigne, is 62 miles. The 5th A. from Mézières viâ Rocroi has 75 miles to cover. Thus the enemy, detaching two corps to follow the Belgians, can, with a day's start,[6] easily arrive on the Sambre on the 18th. Even if not reinforced in the meantime he can arrive with four corps, while the 5th A., arriving on the 20th, will have only three (3rd, 10th, 19th). The 1st C. is at Dinant, guarding the passage; the 18th C. cannot be in line until the evening of the 21st,[7] the B.E.F. not until the evening of the 22nd. But it is highly probable that the enemy will be reinforced, while there are distinct indications of the presence of an enemy army on the right bank of the Meuse betwen Givet and Namur.[8] It has already been urged in this article that once an enemy army appears on the Sambre and another is on the right bank of the Meuse, below Givet, the salient becomes untenable. The 5th A. should not go north of Givet, nor the

[1] Joffre apparently leaves it to French to arrange this.

[2] "*C'est un principe qui n'admet pas d'exception que toute jonction de corps d'armée doit s'opérer en arrière et loin de l'ennemi.*" (Napoléon).

[3] Lanrezac, p. 79.
But see Joffre's telephone message to Lanrezac on 17th August. It is difficult to reconcile this with what Joffre had said three days previously.

[4] "La bataille," p. 62.

[5] This seems to have been the view adopted by G.Q.G. in fixing upon Nivelles as the direction of the British advance (Joffre's note to French).

[6] The 5th A. starts on the 16th.

[7] Lanrezac, p. 89.

[8] Sordet's report of 14th August.

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B.E.F. north of Maubeuge.[1] To go to the Sambre exposes them to envelopment and defeat in detail. To send them north of the Sambre to wander through the heart of Belgium is sheer insanity.

It will be noticed that in Special Instruction No. 10 of 15th August, the 5th A. is ordered, not to the Sambre, but *to* Marienbourg or Philippeville, respectively 14 and 21 miles from the Sambre. How is it that the 5th A. turns up on the Sambre and the B.E.F. at Mons? Lanrezac is silent on this point. That he recognises the danger and protests is clear, for he says: "The assurances of G.Q.G. finally convinced me that the 5th A. and British army will fully have time to debouch unhindered north of the Sambre and effect their junction with the Belgian army."[2] There seems to have been a change of mind at G.Q.G. between 10 a.m. (Sp. Instruction No. 10) and 2 p.m. (note to French). Evidently a great deal remains to be elucidated with regard to this phase of the operations..[3]

It is remarkable to find G.Q.G., at 3.30 p.m. on this day, issuing instructions to the 3rd A. to prepare to invest Metz.[4]

16 August.

The last fort at Liége falls. The G.Q.G. announces that the German hastened attack in Belgium has miserably failed.[5]

The 5th A. marches for the Sambre. The 18th C. is withdrawn from the 2nd A. to join it.

The grouping of the German armies now appears to G.Q.G. to be as follows[6]:—

Two armies of the Meuse—VII, IX, X, and III, IV, XI.
Army of Belgian Luxemburg[7]—Guard, XII, XIX.
Army of Luxemburg-Thionville—VIII, XVI, XVIII.
Army of Lorraine—I, II, and III Bavarian.
Army of Alsace—XIII, XIV, XV.
Russia—I, II, V, XVII, XX.
Not identified—Reserve groups.

Remembering that G.Q.G. takes only enemy active corps into account, we see from this report that the Germans are believed to have 6 corps on the left bank, 6 in Alsace-Lorraine, and only 6 in the centre between Liége and Thionville, a front of 90 miles. Evidently this seems to open great chances of breaking their centre.[8]

[1] A front Givet—Philippeville—Maubeuge would also fit in with the intended operation of the 3rd and 4th A's.

[2] Lanrezac, pp. 86, 90.

[3] General Berthaut in "L'erreur de 1914" hints that political pressure was put on G.Q.G. with the idea of helping the Belgian army. It is also known that on the 3rd August the French Government offered to assist Belgium with five corps.

[4] "La bataille," p. 91.

[5] This enormous *gaffe* has never been explained. When questioned at the C.I. Joffre said that he did not remember it. When the text was then shown to him he argued that the *communiqué* was not official.

[6] Intelligence Report, 3rd A., "La bataille," p. 97.

[7] Belgian Luxemburg is, roughly, that portion of Belgium S. of a line drawn from Malmedy to Givet.

[8] On the 18th or 19th Berthelot telephones to the War Minister: "The more (of the enemy) there on our left the better; that will enable us to break their centre." Au bord, p. 199.

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Of the 22 active German corps sent to the Western front, 18 have now been identified. Since the detrainment of the I and II Armies was not completed until the 12th August, and of the remainder not until the 17th, this is good work.[1] Two corps, VI and XXI, are not accounted for, and the II and V are believed to be on the Russian front, although part of the II had been indentified at Liége on the 7th.

The VII C., leading the II Army, crosses at Liége.[2]

17 August.

The main body II Army crosses above Liége. G.Q.G. intelligence report mentions only a brigade of enemy infantry crossing below Liége, but that the bridge at Huy had been repaired during the night of the 15th/16th and that troops were crossing, strength unknown.[3]

The Belgian command hears that the enemy is crossing at Ampsin and Huy.[4]

Joffre telephones Lanrezac at 8 p.m. :

" It is urgent that the cavalry corps should carry out the mission assigned to it yesterday.[5] Brussels is frantic and the Government is retiring to Antwerp. The Belgian army must be prevented at all costs from following[6]. . . . . "

G.Q.G. telephones to 4th A. that nothing is known about the Bertrix-Paliseul region, nor Tintigny-Virton, and asks for air reconnaissances.

18th August.

The Germans outflank the Gette position. " It was known that the II, IV and IX C. . . . . were opposite the Belgian left. . . . while the Guard, VII and X were marching against the Belgian right . . . . . It was also known that the active corps were being followed by reserve formations, viz., in the I Army by the III, IV, and IX R.C.; in the II Army by the Guard, VII and X R.C.; in the III Army by the XII R.C."[7]

Thus six active and six reserve corps are known to be between the Gette and the Meuse. But G.Q.G., if this information reached it, still takes no stock in the reserve corps.

The Belgian army retires on Antwerp.

G.Q.G. Special Instruction No. 13,[8] 8 a.m.

The 3rd, 4th and 5th A's, acting in concert with the British and Belgian armies, are to act against the German forces round Thionville, in Luxemburg and in Belgium. These seem to comprise in all 13 to 15 corps, in two principal groups. In the north, 7 to 8 corps,

[1] The reserve corps detrained one or two days later than the active (Bulletin Belge, August, 1920).

[2] Bülow—"Mein Bericht."

[3] Palat III, p. 72. The passage of the II A. seems to have been missed by G.Q.G. Intelligence.

[4] "Le secret," p. 517.

[5] See p. 13, April "Journal."

[6] Cf. Joffre's previously expressed opinion of the Belgian army.

[7] H.G.W. I, p. 34.

[8] Lanrezac, p. 98. "La bataille," p. 209.

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constituting the enemy right. In the south, between Bastogne and Thionville, 6 to 7 corps.[1]

As regards the 5th A. and the British and Belgian armies, two eventualities must be kept in view :—

1. The enemy, marching by both banks of the Meuse, endeavours to pass between Givet and Brussels, and may even accentuate his movement towards the north. In this case the 5th A. and Cavalry Corps will, in concert with the British and Belgians, directly oppose this movement, seeking to flank the enemy by the north, while the 3rd and 4th A's attack the enemy centre. The 4th A. would then immediately turn against the left flank of the German right wing.
2. The enemy engages only a fraction of his right wing on the left bank. While his centre engages our 3rd and 4th A's in front, that part of his right wing which remains on the right bank attempts to attack the flank of the 4th A. In this case the 5th A., leaving the British and Belgians to deal with the enemy on the left bank of the Meuse and Sambre, will turn by Namur and Givet towards Marche and St. Hubert. Instructions for the construction of a strong bridgehead east of Givet follow.

Commenting upon the above it will be seen that in the first case G.Q.G. still does not recognise the strength and scope of the German turning movement, although it should be known that the 6 corps known to have crossed on the 15th have since been heavily reinforced. The German right is still believed to be marching on some point E. of Nivelles, for the B.E.F. is still to outflank it. As to the Belgian army, G.Q.G. is obviously in complete ignorance of its situation.

In the second case G.Q.G. seems to believe that the German forces on the left bank may re-cross the river; that in reality the crossing to the left bank was a feint. In fact G.Q.G., although on the 15th it professes to believe that the enemy is making his principal effort north of Givet, still clings to its original idea of the German right marching on Mézières. And, as Lanrezac points out,[2] the steps to be taken to counter such a move involve an impossible manœuvre for the 5th A. Facing N. by W. on the Sambre, with all its trains and impedimenta in rear of it, it is to turn three-quarters about and cross the Meuse. And it is even considered that, apart from the fact that the enemy is known to be present on the right bank of the river, there would in a war of movement be time to construct a bridgehead with a frontage of ten miles in a thickly wooded country.[3]

The 9th C. is withdrawn from the 2nd to join the 4th A.

[1] The estimate of 7 to 8 active corps is not too bad (there were 10). The estimate of 6 to 7 active corps between Bastogne and Thionville is correct, but what has become of the German force announced on 15th August to be marching on Sedan—Montmédy—Damvillers?

[2] P. 101.

[3] G.Q.G. strategy is redolent of war games played at the *Centre des hautes études militaires*. Cf. Guise, Lanrezac, p. 219.

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20th August.

In Lorraine the 1st and 2nd A's, which since the 18th had been meeting with increasing resistance from the German rear-guards, run up against the strongly fortified positions between Delme and Phalsbourg.[1] Obliged to guard the flanks towards Metz and Strasbourg, they attack with about five corps of their original ten. Heavily counter-attacked at the right moment the 1st A. holds its ground, while the 2nd is driven back six to nine miles. Both armies retreat next day.[2]

It has been urged that the attack had to be made in order to hold fast the enemy in Lorraine who was " felt " to be moving west. No such movement was taking place. Thinking to contain, the French are themselves contained; 345,000 Germans contain 456,000 French.[3]

At 8.15 a.m. Berthelot telephones to General d'Amade at Arras: " Reports on German forces in Belgium are greatly exaggerated. There is no cause for alarm."[4]

At 10 a.m. Colonel Huguet, head of the French mission at G.H.Q., who is evidently uneasy, telegraphs G.Q.G. that a large part of the II Army has crossed the Meuse at Huy, and that the previous evening the German front appeared to be on the line Louvain-Audin (?); that at present there are probably five or six corps north of the Meuse, and others will probably follow.[5]

But in a directive to 4th A., 3 p.m., Joffre states that aviation reports do not point to the conclusion that the enemy has yet launched his offensive![6] (on the left bank).

The intelligence liaison between G.Q.G. and the Belgian army, if it had ever existed, has evidently now broken down completely.[7] G.Q.G. has already recognised the presence of two German armies on the Meuse, and Huguet's estimate of six corps on the left bank merely confirms previous information. But Lanrezac estimates this force at nine or ten corps, and the group about Dinant at more than one corps. Three of his corps (3, 10, 19) arrive on the Sambre in the evening.[8] The 18th has not arrived, and the 1st cannot move from Dinant. The B.E.F. is not yet in line. He wisely decides to wait, and informs G.Q.G. accordingly, which approves.[9]

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[1] Full information as to the positions in front of the 2nd A. was in its possession. "Au bord," p. 196.

[2] Colonel Grouard, writing in 1913, prophesied a disaster if this offensive were undertaken.

[3] H.G.W. I, p. 45.

[4] "La bataille," p. 113.

[5] "La bataille," p. 113.

[6] Joffre adds that the time has not yet come for the actual attack, and that the emptier the enemy leaves the Arlon—Audun le Roman district the better. In a sense he is correct in thinking that, following the general movement, the Germans are marching across the front of the 3rd and 4th A's from E to W. In reality the IV and V Armies are taking position from Gedinne in the W. to Audun le Roman in the E., facing S.W.

[7] It will be remembered that the Germans had attacked at Haelen on the 12th, and that the Belgian army had begun to retire on Antwerp on the 18th.

[8] Also 37th and 38th D's.

[9] "La bataille," p. 117.

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The I Army enters Brussels.

Directives are issued at 8.30 p.m. to 3rd and 4th A's for their advance.[1] 3rd A., the two left corps on Virton and Tellancourt, the right corps following in echelon. The 4th A. is to push strong advance guards on the line Bierre, Paliseul, Bertrix, Tintigny, to ensure its debouchure beyond the Semoy. General direction, Neufchâteau.

The B.E.F. completes its concentration between Maubeuge and Le Cateau.[2] An air reconnaissance observes a column of troops stretching through Louvain as far as the eye can reach.[2]

21st August.

At 1.10 a.m. Huguet telegraphs G.Q.G. that Major Baird, sent to Charleroi, learned that German cavalry and infantry were moving from Fleurus on Charleroi. The Belgian civil authorities report German troops near Nivelles and Waterloo, that Brussels has been occupied and that the enemy is pushing west on Ninove with all arms. Confirming this by letter at 7.20 a.m., Huguet adds that the British G.S. has located five or six corps between Brussels and Namur and considers it probable that other corps will prolong the line towards Brussels and west of that place.

The above again confirms G.Q.G. information, and Huguet is telephoned to at 5.40 p.m. in that sense. Also, that the operations will be carried out as arranged.[3]

For in the meantime, at 7 a.m. a Special Instruction No. 15 has been issued to 5th A. and B.E.F.[4] to the effect that the first eventuality mentioned in Special Instruction No. 13 of 18th August appears to be in process of realization (enemy passing between Givet and Brussels), that the 3rd and 4th A's are commencing their advance this day, and the 5th A. is to take the enemy group of the north as its objective.[5] The B.E.F. is requested to co-operate on the left of the 5th A., moving in the first instance on Soignies.[6]

The situation on the evening of the 21st is so menacing, with the German front stretching from Grammont through Nivelles to Charleroi and Namur, and thence southward to the Lesse, that the failure of G.Q.G. instantly to withdraw the 5th A. and B.E.F. seems wholly inexplicable. The following is suggested as the only possible explanation.

As before, G.Q.G. reckons only with the active German corps. Of these there are believed to be 19, or at most 21, on the western front. There are 6 in Alsace-Lorraine; 6 to 7 between Bastogne and Thionville; 7 to 8 N. of Bastogne. Of these last there may be 1 or 2 on the front Namur-Lesse, leaving 6 on the left bank of the Meuse. Two may be reckoned as detached north of Brussels, leaving only four on the front Grammont—Charleroi—Namur, a front of 60 miles, or 15 miles per corps. Therefore G.Q.G. believes that the 5th A. and

[1] "La bataille," p. 218.
[2] H. G. W. I, p. 48.
[3] "La bataille," pp. 115, 116.
[4] Ibid, p. 112.
[5] The 5th A. is to "lean" upon the Meuse and Namur. The Germans commence their attack on Namur on the afternoon of the 21st.
[6] "La bataille," p. 112.

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B.E.F. will easily burst through the thin German line, and the breaking of the German centre in the Ardennes will complete the victory. What matters then that the Allied left wing will be isolated and 40 or 50 miles ahead of the centre?

At 9.30 p.m. orders are issued to the 3rd and 4th A's to attack on the morning of the 22nd.[1] The 4th A. is to attack the enemy wherever met, with the object of driving the enemy against the Meuse between Dinant, Namur and the Ourthe. The 3rd A. is to march in echelon, right refused, on the right of the 4th, ready to face E. if necessary.

Since so much depends on the issue, it is well to enquire what prospect the intended attack has of obtaining the quick decision necessary to stop the German turning movement .

The eastern portion of the Ardennes is a low plateau which, falling somewhat rapidly to the Grand Duchy on its S.E. side and to the Semoy in the S., slopes gently to the Lesse and upper Ourthe on the N.W. side; then rises again, a low ridge running parallel to the lower Ourthe, and finally subsides into the valley of the Meuse towards Namur and Liège. The densest portion of the forest, between Givet and Mézières, throws off two well-marked belts; one to the E.S.E. along the deep Semoy valley; the other N.E. towards St. Hubert, Laroche and Spa,, but the country is everywhere dotted with irregular patches of wood. The soil is poor, the plateau thinly inhabited, and supplies are scanty. The main roads run mostly N.E. and S.W. or N. and S., comparatively few from S.E. to N.W.

The left flank of the 4th A., five corps strong, is at Paliseul; the right of the third A., three and a half corps, near Spincourt. Each army is believed to have three enemy corps in front of it.[2]

If one can imagine the French armies, badly directed and tactically inept as they were on the 22nd, pushing back the ten German corps in front of them, they will then have to wheel through a right-angle in order to pin the enemy against the Meuse. The right flank will have to cover near 100 miles to reach that river. Advancing north, it first becomes entangled in the deeply cut and wooded valleys of the Sauer, Sure and Wiltz, which afford successive lines of defence, while its rear will be exposed to enterprises from the line of the Moselle. Still progressing N. and W. the strong line of the upper Ourthe will have to be forced, and the northern belt of forest already mentioned penetrated. At this stage the left wing comes up against the strong line of the Lesse, known to be held in some strength, while the 3rd will have to force the line of the lower Ourthe before it can descend into the valley of the Meuse. It will be seen therefore that at best the operation will be a very slow and costly process. The nine corps available have not sufficient driving power to overcome the difficulties of the ground *plus* enemy resistance, space and time, and no reinforcements are available. The operation must inevitably fail, and that situation must arise which is described on page 46, H.G.W.I;

[1] "La bataille," p. 117.
[2] "La bataille," pp. 128, 129. Correct so far as active corps are concerned.

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the I, II and III Armies, 34 divisions, are left free to deal with the 5th A., B.E.F. and Belgians, 20 divisions.

On this day the II Army establishes close contact with the 5th A. on the Sambre, and gains a footing on the right bank. The 18th C. arrives at Thuin in the evening.

The B.E.F. moves up level with Maubeuge and to Landrecies.[1]

The German attack on Namur commences in the afternoon.[2]

22nd August.

Of the action at Charleroi which, commencing on the evening of the 21st, lasts until the afternoon of the 23rd, it must be said that in none of the frontier battles is the tactical superiority of the Germans so clearly shown as here. Issuing from the defile of the Sambre, they, nowhere displaying superior numbers,[3] have to make a frontal attack upon positions which might have been made very strong. Well supported by their heavy artillery, advancing methodically from point to point and entrenching their gains, they make steady progress. On the other side the 5th A., allowed by its commander to get completely out of hand,[4] literally throws itself away in disjointed and desultory counter-attacks unsupported by artillery.

In the centre of the Allied front, matters are no better on the 22nd. The battle of the Ardennes is the story of the Babes in the Wood. Everywhere the wicked uncles get busy. The 4th A., five corps,[5] issuing from the Semoy defiles, finds the Germans in position on the rim of the plateau, in most cases well entrenched.[6] Everywhere the French corps are ambushed in the woods or otherwise surprised, and by midnight the whole army is in retreat towards the Meuse.

In the words of M. Hanotaux. "There was no unity of command, no protection before or during the action; there was systematic disregard of ground and defensive means; no liaison between corps, no liaison of infantry and artillery, no manœuvre—nothing but a blind, frenzied offensive."

In the 3rd A. things go slightly better, but by night the three and a half corps are obliged to retreat. Joffre's decisive battle is over.

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[1] H.G.W. I, p. 50.

[2] Lanrezac, p. 157.

[3] Lanrezac, p. 169.

[4] Lanrezac, knowing as he does (his Chapter V) the mentality of the troops, their inclination to get out of hand, their reluctance to entrench, the insubordinate spirit of the staffs and the general craze for the offensive, should have remained near his army and kept a tight grip on it. But on the 20th his H.Q. are at Signy le Petit, 40 miles from his army (p. 109). In his orders for the 21st (p. 117), his intentions are not clear, and the order to the 3rd and 10th C. to place themselves "*en bataille*" is quite sufficient to ensure a break-away. He orders his troops not to cross the Sambre, but the order is disobeyed. On the evening of the 21st he knows nothing of the severe engagements of the 3rd and 10th C. (p. 157). On the 22nd he goes to his command post at Florennes, hour not stated, but it is apparently not until the afternoon (p. 162). On the 23rd his H.Q. are at Chimay, still too far back. No operation orders for the 22nd and 23rd are given in his book.

[5] The 9th C. from 2nd A. was not engaged on the 22nd.

[6] The only information issued the night before by the 4th Army command is that the region between the Meuse and the Lesse is occupied by the enemy, who is entrenched behind the Lesse, facing South. (Le secret).

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In the evening the B.E.F. takes up its positions about Mons.

23rd August.

Joffre complacently writes to the War Minister. " Generally speaking, the strategic manœuvre is now terminated. Its object and result was to place the mass of our forces at the enemy's most sensitive point, and to assure ourselves of *numerical superiority*[1] at that point[2] ". . . .

In the morning, Lanrezac hears of the retreat of the 4th A.,[3] that the enemy has crossed the Meuse above Dinant, routed the reserve division guarding the passages, and occupied the Onhaye plateau in rear of his right; also that the right flank German army is about to fall upon the B.E.F. Sending orders to the 1st C. to restore the situation at Onhaye, he finds that its commander has already taken the necessary steps. In the evening, the 5th A., still being driven back, is on the line St. Gerard, Thuillies, La Buissière (S. of Binche). At 9 p.m. Lanrezac decides to retreat,[4] and issues his orders.

At Mons two divisions of the B.E.F. hold their ground against six divisions of the III, IV, and IX Corps.[5]

At 4.40 p.m. Joffre sends the following communication to Lanrezac. " I beg you to let me know your opinion on the situation and what you intend doing. You are in touch with Marshal French. What is your appreciation of the situation and what support is he able to give you?"[6]

And French receives a telegram from Joffre at 5 p.m. informing him that at least three German corps, viz. *a reserve corps*[1] and the IV and IX active corps were advancing against the front of his position, while the II C. was executing an enveloping movement in the direction of Tournai; also that the reserve divisions and the 5th A. on the British right were retiring.[6]

These two messages constitute what has been called " The enigma of Charleroi." The solution seems not far to seek. G.Q.G., finding that instead of having a few scattered enemy corps to deal with, one strong army is pushing back the 5th A. whilst a second is swooping down on the B.E.F., and realising at last that it has fatally miscalculated the German strength, completely loses its head.

Thus, less than four days after the first battle of the frontier has been joined, the French armies are everywhere in retreat. As Lanrezac remarks " There is no other instance of such a disgrace in the history of the world."[7]

The elder Moltke, nowadays considered jejune and out of date, but who, after all, knew something about war, said " An error made

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[1] Writer's italics.
[2] "La bataille," p. 130.
[3] Lanrezac, p. 178 et seq.
[4] "La bataille," p. 157.
[5] H.G.W. I., p. 48.
[6] "La bataille," p. 154.
[7] When too late, G.Q.G. perhaps realises the truth about the German reserve troops. p. 195.

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in the initial concentration of an army can seldom be made good in the course of the campaign." So in this case. The error was not made good at the Marne; it was only mitigated, and had to be paid for with another four years of war.

Ossa is heaped upon Pelion. On the top of the disastrous plan of concentration, which involves a partial and objectless offensive motived by sentiment in a subsidiary theatre, G.Q.G. piles other and gratuitous errors; an ill considered and hopeless offensive in the Ardennes, and, to crown all, the strategic wing is isolated and sent forward piecemeal to destruction. In both cases the operation is based upon the gravest miscalculations as to the enemy's strength and dispositions.

At the Commission of Inquiry held in 1919 Joffre, in giving evidence, lays the blame for the collapse upon his subordinate commanders, upon the 4th and 5th Armies, upon the B.E.F., upon the Belgian army, upon his troops generally, upon everybody and everything rather than upon his own inept dispositions.

Since his appointment in July, 1911, Joffre had had autocratic power as regards all appointments to the command of armies and corps. If the commanders proved below par, the responsibility remains his.

As C.G.S. he was responsible for the peace training of the troops. If in war the tactics employed proved bad, the responsibility remains his.

The G.S., hypnotised by the encounter battles of 1870, fondly imagining that in the reckless and violent offensive suitable only for the encounter battle they had found an unfailing recipe for victory under all conditions, inculcated this spirit in the manuals and in the army. The word " defence " was struck out of the military vocabulary. Result; in war the army, until educated by bitter experience, knew neither how to attack nor how to defend.

Another element of ruination was gratuitously introduced. There can be no doubt but that at the outset of the war the shadow of 1870 still hung to some extent over the French army; there was a certain nervousness at meeting the invincible German. When therefore in Alsace on the 7th August and in the Vosges and in Lorraine from that date until the 18th, the German covering troops fell back before the advancing 1st and 2nd Armies,[1] the revulsion of feeling was immense. The terrible Germans were fleeing. And G.Q.G. greatly aggravated matters by issuing bombastic and inflated *communiqués* which, coupled with the prevailing sentiment about Alsace Lorraine, worked up the army to such a frenzy of reckless bravery and over-confidence that it entirely forgot such peace training as it had received. Instead of ruining the *moral* of the army with his rhodomontade, Joffre's trumpet-call to the army in August should have been " Steady."

And what of the future? Believing as we do that while the British and French nations will never understand each other, they are yet mutually indispensable and must stand together, what guarantee

[1] Cf. Sarrebruck, August, 1870.

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have we that the next time we stand shoulder to shoulder we shall not again find ourselves ' in the soup '? For we must remember that it is to the fundamental and patent incompetence of the French command and General Staff for years before the war and during the first operations that we owe the agony of the retreat from Mons, the outpouring of blood and treasure for four years, and a world turned upside down. Intoxicated by ultimate victory, France has shut her eyes to the root causes of her disasters. The *camarilla* which bungled her national defence is still in power. Buat, the man of the railway carriage plan, is C.G.S. Berthelot, who as head of the Operations Bureau at G.Q.G. was responsible for the initial operations of 1914, is a member of the *Conseil Supérieur de la Guerre*. Until France has evolved a sane and sound school of military thought and learned to curb the power of the G.S. we must carefully avoid entering upon any military commitments to her.

To return to the operations. Destructive criticism is easy. To make a constructive effort, what measures might, given a more receptive mentality at G.Q.G., reasonably have been taken between the 2nd and 23rd August to remedy the faulty plan of concentration? And what should the original plan of concentration have been?

As regards the first question, the difficulty is to divest one's mind of what one now knows, and to construct dispositions upon the facts as they presented themselves at the time. And we are not yet in possession of all the facts, by any means. In particular, we have not full knowledge of the intelligence regarding the enemy which reached G.Q.G. Was G.Q.G. adequately informed or not? When Joffre was under examination at the C.I., the President, presumably with all the documents before him, pointed out that G.Q.G. was fully informed as regards the German turning movement, and that the most definite information was received. French writers agree, and in the absence of any counterbutting evidence we must conclude that it was so. As to dates, Colonel Grouard, a distinguished authority, thinks that from the 10th August the German intention to operate by the left bank of the Sambre-Meuse could no longer be in doubt, and that by the middle of the month G.Q.G. was sufficiently informed to make judicious dispositions.[1] However, the suggestions which follow are based as far as possible on published reports and the inferences that might reasonably be drawn from them.

Once more the reserve troops form the deciding factor. The inefficiency of the French reserves must be accepted, but as to the German, one must at least claim to obey the dictates of common sense and previous knowledge[2] and assume that they will be sent against France and used in first line. Consequently the Germans will have a considerable superiority in numbers, and France must abandon all idea of a general offensive and concentrate upon a single defensive—offensive operations, utilizing ground in order to economize force. The railway and the spade, judiciously used, should prove powerful

[1] La conduite de la guerre, pp. 27, 40.
[2] French G.S. memorandum, 1911. See p. 3, " April Journal."

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auxiliaries. Early steps must be taken to remedy the over-concentration in Alsace-Lorraine, and that theatre becomes subsidiary.

The following measures are suggested :—

4th August.

German troops enter Belgium.

A French liaison mission, with intelligence staff, leaves for Brussels. Special telegraphic facilities between Brussels and G.Q.G. are arranged for.

A preferable disposition of the Cavalry Corps has already been suggested.

6th August.

German attack on Liége.

The cavalry division of 5th A., as soon as available, marches to Givet and Dinant, reconnoitring on Ciney, Marche, etc.

Four cavalry divisions in Alsace-Lorraine are unnecessary, whereas cavalry is badly wanted on the left flank. As soon as detrained, two divisions of 1st and 2nd A's march to the Sambre, 12 days' march, to rendezvous with the Cavalry Corps.

The intended offensive of the 1st, 2nd, 3rd and 4th A's is abandoned.

Ordinary prudence requires the re-constitution of a strategic reserve. The concentration must go on, but there seems to be no reason why the 17th C. (Toulouse), 18th C. (Bordeaux), Colonial C., 19th C., and Morocco D., which bring up the rear of the procession, should not be diverted viâ Paris Ceinture west and Compiégne to La Fère. These units form a new 2nd A.

The 2nd A. as formerly constituted is dissolved, and its H.Q. are transferred to Soissons.

The 1st A. takes over the front of 2nd A. in addition to its own, also the 20th C. It digs in, preparing successive lines of defence, remains on the defensive and fights on the retreat if necessary. The 18th C. and Morocco D. have already been withdrawn.

The 1st A. is directed to send the 9th and 13th C., as soon as detrained, by road to join the 4th A. (Toul to Stenay, 5 marches) and to hold the 14th, 15th and 16th C., upon detrainment, at the disposal of G.Q.G. for re-entrainment. G.Q.G. makes the necessary arrangements for rolling stock, etc.

The 3rd and 4th A's entrench on the Chiers and Meuse, and proceed as for 1st A.

The 1st, 3rd and 4th A's, forming the defensive sector of the front, are grouped under one commander.

The bridges between Givet and Mézières are broken and the roads leading from the Ardennes to Mézières and Sedan are destroyed at suitable spots by mining, so far as time permits.

10th August.

B.E.F. to concentrate at Amiens in the first instance.

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14th August.

Three German corps are reported crossing the Meuse at Visé.

G.Q.G. orders :—

2nd A. to dig in behind the Somme, Crozat Canal and Serre, roughly from Crécy to Nesle inclusive.

B.E.F. 1st C., round Roye, with 2nd C. echeloned on its left rear; in readiness, facing N.

5th A. on the front Mézières-Signy l'Abbaye, distributed in depth and facing N.W. The 12 C. from 4 A. joins it.

The 14th, 15th, and 16th C. to commence entraining for the Serre, to form a new 6th A. Three double railways are available,[1] and the move should be completed within five days.[2] Front, Rozoy-Marle.

The 2nd, 5th and 6th A's and B.E.F. should be concentrated by the 21st. From Visé to the Somme is about 160 miles. Assuming the case most unfavourable to the Allies, that the Belgian army at once retires on Antwerp, the Germans, making eight successive forced marches, might appear on the Somme on the 21st. Allowing one day for closing up, the enemy right wing might then be ready for action on the 23rd, but this estimate favours the enemy.

D'Amade's group of 2 reserve and 4 territorial divisions concentrate at Amiens, and entrench N. and E. of that place.

A few days after issuing these orders, G.Q.G. moves from Vitry le Francois to Meaux or other suitable point.

Mangin's infantry brigade from Givet retires on Mézières when necessary.

The new concentration provides a " mass of manœuvre " of the equivalent of 15½ corps and 7 cavalry divisions between Mézières when Roye. The new composition of the French armies is :—

1st. A. 7, 8, 20, 21 C.; 44th D., 5 Alpine groups, 6 r.d's, 2 c.d's.
2nd A. 17, 18, 19. Colonial C. Morocco D.
3rd A. 4, 5, 6 C.; 3 r.d's, 1 c.d.
4th A. 2, 9, 13 C; 2 r.d's, 1 c. d.
5th A. 1, 3, 10, 11, 12 C.; 3 r.d's, 1 c.d.
6th A. 14, 15, 16 C.
1st Cavalry C. (Sordet) 3 c.d's.
2nd Cavalry C. (from 1st and 2nd A's) 2 c.d's.

By the above arrangement the five covering corps are left in position.[3]

The intended operation is, by taking advantage of the gap in the German front caused by the gorge of the Meuse between Givet and Mézières, to break the German centre with the 5th and 6th A's. The 5th A. attacks the left flank of the German army which will *certainly*

[1] 1. Toul—Lérouville—Revigny—Ste. Menehould—Amagne—La Ferée—Magny.
2. Pont. St. Vincent — Mirecourt — Neufchâteau — Gondrecourt — Joinville — Vitry le François—St. Hilaire—Reims—St. Erme.
3. Blainville—Epinal—Chalindrey—Chaumont—Troyes—Paris—Ceinture east—Soissons—Laon—Pierrepont.

[2] A fourth corps might be spared from the East to join the 6th A, but it is doubtful whether it could be railed across in time.

[3] 2, 6, 20, 21, 7.

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appear at Tremblois (S. of Rocroi) and Auvillers, while the 6th A. attacks in front. Should the German right wing attempt to assist the centre by working eastward, the 2nd A. and B.E.F. move up and attack north-eastward.

An alternative, if more risky, manœuvre might be :—

The 2nd A. and B.E.F. are disposed as before. The 5th A. is posted on the front Vervins-Hirson, facing N.W. and distributed in depth; the 6th A. is similarly placed between Vervins and Marle. In this case defensive positions would have to be prepared at Rouvroy (10 miles W. of Mézières), Auvillers (13 miles E.S.E. of Hirson) and Etreauport (7 miles W.S.W. of Hirson). Leaving one or two corps in these positions, the 5th and 6th A's take the offensive in a N.W. or W. direction, the 2nd A. and B.E.F. moving up as before if opportunity arise.

There are other solutions, and the above rough suggestions are offered for what they are worth. The main point is to effect a safe re-concentration with intact armies, and almost anything seems preferable to the course actually adopted in 1914.

When considering what the original plan of concentration should have been we must return to the question of available forces. In the years before the war the French G.S. knew that Germany might mobilize fifty corps for the first shock.[1] Assuming that she sends five to the eastern front, she can send forty-five against the French twenty-four corps. *This was the situation which really confronted France,* and to suggest a French plan of concentration on this basis is a problem that the present writer prefers to leave to someone else. However, if only the forces placed in line in August be considered, it is suggested that the plan should have been practically identical with the reconcentration of the 21st August which has been proposed.[2] As before, the frontier is at first divided into defensive and defensive-offensive sectors, the troops for the defensive sector being of course posted first. In the suggested reconcentration the twenty-four corps are almost equally divided between the two sectors. This is because of the unpreparedness for defence of the eastern side.[3] Judicious steps, previously arranged for in time of peace so as to permit of the strengthening of the frontiers being taken in hand with the commencement of the period of diplomatic tension[4] would admit of the garrison of the defensive sector being reduced in favour of the mass of manœuvre.

[1] Each active corps forming a reserve corps. French G.S. Memorandum, 1911 (ante).

[2] For territorial reasons the 5th A. would form the left of the French front.

[3] Illuminating details of the neglect of defensive work in August are given in "La 3e division d'infanterie," by General Regnault. See also Joffre's examination before the C.I.

[4] 23rd July. Austrian ultimatum to Serbia.

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Finally, the railway system of N.E. France is capable of material improvement for military purposes. The railways mainly radiate from Paris, and in so far as the strategic system has been developed this has been effected chiefly with a view to rapid concentration on the Alsace-Lorraine side, while transverse lines running parallel to the frontier have been neglected. The only two transverse lines between Paris and the frontier are :—Lille—Cambrai—Buire—Amagne—Ste. Menehould, etc., and Amiens—Tergnier—Reims—St. Hilaire—Vitry le François—Revigny etc. Both these are too near the frontier and both were lost to the French in the first German rush on Paris, with the result that all subsequent movements of troops from east to west had to be carried out viâ Paris. At least one additional transverse line of high carrying power is necessary. This might take off at Amiens or Beauvais and run viâ Creil, Meaux, Coulommiers, Romilly, Troyes, Brienne, Joinville and Gondrecourt, or it might even be brought round west and south of Paris. It would be carried across existing lines by means of bridges, so as to afford independent and rapid transit from one flank to the other, and would be connected by means of embanked loops with the more important lines radiating from Paris.

Works consulted: Engerand, La bataille de la frontière. Le secret de la frontière. Percin, 1914. Les erreurs du haut commandement. Lanrezac, Le plan de campagne français. Grouard, La conduite de la guerre. Le plan 17 (anonymous). Berthaut, "L'erreur" de 1914. Regnault, La 3e. division d'infanterie. Bulletin belge des Sciences Militaires, August, 1920. Palat, La grande guerre. H.G.W.I. Margueritte, Au bord du gouffre. Von Bülow, Mein Bericht.

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EARLY BASE WORK IN FRANCE.

BY MAJOR-GENERAL Sir W. E. IRONSIDE, K.C.B., C.M.G., D.S.O.

IMPROVISATION is the fate of the British officer all the world over. His life leads him up against problems to which there is no official solution, and he has to buckle to with his own. Seldom will a British army have a more carefully arranged plan for concentration than that which existed in 1914, and even then, there were many gaps to fill. The following account, therefore, may be of interest as showing the lot of a junior officer at a Base in those early days of 1914.

On being informed that one's appointment in case of war would be mobilizing officer of No. X Base, one began to feel a nasty taste in the mouth. What a climax to many years of careful preparation for war, to be ignominiously left at the Base, where one would miss everything. But, wars have a way of dragging on and of giving everyone his chance, despite all prognostications to the contrary. In '99 was not the Christmas dinner to be eaten in Pretoria? And this initial work of the Base is of the utmost importance. A single hitch may ruin a tactical manœuvre only a few days later. It is generally the lot of the Staff College student, fresh from similar exercises on paper, to fill these Base appointments. And so one found oneself actually at a Base.

The Bases assembled in Southampton, which became a busy bustling town of khaki. The mobilizing officer sat at a table in his assigned hotel and ticked off the various members of the Base as they arrived. For the most part, outside the batch of students from the Staff College, they were of the dug-out order. No little care was necessary in the assembly of the personnel, for all wished immediately to go away again, one had even married a wife, another had no uniform and a third had papers to sign. The only thing was to be adamant and make no exceptions. One distinguished officer of older days insisted that he was Commandant X Base when he was really Commandant X Base Depôt, and it took a considerable altercation to convince him that there was a difference between these two things.

But, at last all were assembled and one sunny evening the whole outfit filed down to the dock gates, carrying their goods and chattels, those numerous superfluities with which a war is commenced, and which are so soon discarded. We were passed through a narrow wicket gate, most carefully scrutinised and counted by an ancient warrior, who finally demanded that I should, in addition, sign a certificate that all the party was present.

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A lovely summer night's crossing brought us in the early morning to Boulogne, leaving behind us a big trooper, crammed with Indian Army officers, due to return to India, and in an actual state of suppressed mutiny in consequence. Poor devils, how even we of the Base pitied them. I had to eject two from our ship, where they had esconced themselves as stowaways.

The docks at Boulogne were crowded with a cheering crowd, mostly women, and it was really a gauntlet of no mean order that we ran to reach the cars that were waiting for us, and so the Castle right up in the old town. As we drove into the small quadrangle, every window was crammed with bearded poilus, Territorials in their long blue coats and red breeches, and we were greeted with a roar as we stepped out to interview the Commandant. The Governor, Colonel Comte Daru was a fine type of old French soldier, quick, sturdy and full of life, despite his grey hairs and little grey imperial. Each member of the Staff paired off quickly with his opposite number, Medicoes, Sappers, Naval Officers and Staff, and work began at once. Wonderful and weird was the French that one heard, but there was no ridicule and everybody was far too earnest to laugh at grammar or accent.

Colonel Reboul, the representative from French G.H.Q., proved himself a man of many parts and nothing was too much for him to do. "Je me charge de ça," "Bon," "Convenu," "C'est entendu," were continually on his lips, and he never failed us.

A little bit anxious at first they were. Were we really going to land the Expeditionary Force, could we really do it, were we not hopeless amateurs? But, the atmosphere soon cleared by reason of our obvious sincerity, and all worked with a will.

The Hotel Christol et Bristol—why do French hotels always have a double title—was daily surrounded by a gaping crowd of onlookers, and at first, a cheer went up whenever an officer had occasion to go out or in. The finest sight of all was undoubtedly our Naval Transport Officer, resplendent in blue and gold, with an enormous aiguillette. To see him depart in an Hispano-Suiza car with open exhaust, was really a magnificent sight and thoroughly appreciated by the crowd.

The tired officer from the War Office who had given us our final instructions had said "Go nap upon the programme." The system was, that all troops should pass into one of the camps erected outside the town, and from there entrain 24 hours later. They would thus have time in which to shake down, open their cases of maps and replace small deficiencies. Each day a Railway Commission assembled and allotted "marches" or hours of departure to the British forces. At first, again, there was a little suspicion. Would we be certain that we could take up the "marches" we demanded? It was important not to ask for too many. Could we give them a list of troops already landed? Statistics had to be made out for the port, and accurate numbers were necessary. But gradually that suspicion disappeared. We were really in earnest, and were not such hopeless amateurs as was thought at first. Extraordinary as it may appear, and thanks to the wonderful weather, not one single "marche" was lost, and we really could go nap upon the programme.

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The first troops to land were the 2nd Battalion of the Argyle and Sutherland Highlanders, and they literally created a sensation. Enthusiasm of the population knew no bounds. This battalion even received a recruit in the person of the gigantic Scottish golf-professional from Hardelot. Here it was that we first saw the appearance of the word "Souvenir" and he who first started the idea of giving up the little brass regimental badges of the khaki jacket undoubtedly caused a deal of trouble. Soon we saw French girls throwing themselves into the ranks, and literally tearing off the little letters to add to their collection at home—the fury of the stamp collector who discovers a new specimen was far eclipsed. The regiments were literally unrecognisable before ever they left the Base.

It was a fine sight to see the old Governor, with tears in his eyes, reviewing the troops as they passed to their camps, singing Tipperary, and they really were fine-looking regiments. The French in those days were grateful for our coming, and as each Regiment filed past, confidence was more fully established.

One of the duties of the mobilizing officer was to see that units left for the front fully equipped, and it is astonishing how much a big sea-port can supply in the way of motor-tyres, oil, petrol, rope, compasses, candles and lanterns, and I was kept fully employed with a pocket full of French notes and another with receipts from tradesmen and units. Everything was paid for in ready money, thus creating immense confidence, for the French tradesmen like to see the colour of their money. My accounts, as can be imagined, were of the simplest kind, and for nearly a year later I was pestered to know how I had accounted for more than I had actually spent—there always seems to be more fuss if one's account is this way than if there is an actual deficiency. It puzzles me why this is so.

Each unit received its interpreter on the docks, where he presented himself with his "affectation" made up as soon as a ship was announced as having sailed. Most of these interpreters were men of the Reserve, many of good age, business men and schoolmasters chiefly. Many beseeched not to be affected to a mounted unit, as they could not ride, and one and all complained of having to wear French uniform in the midst of khaki. Well do I remember one venerable old Zouave in all the glory of his jacket and baggy trousers saying piteously "Look at me, am I not a perfect target"? They were of immense use, however, for French was not the strong point of either British officer or man, and they did their work well and bravely, many being killed with their regiments in the Retreat. The passing of regiments to the Front was easy in comparison with the other multitudinous jobs which fell to our lot. The ordinary boats had not been stopped, and there was a continuous stream of people of all nationalities going to and from England. There were no pass restrictions in those days, and each and all seemed to regard the British Staff Officer as the director of everything. Some had run out of money, many had lost their luggage and none could get a room in Boulogne, which was crammed with all conditions of people. Wives came across to see the last of their husbands, and at first came guilelessly to ask where regiments were, only to be re-escorted to the

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return boat at once; then later they tried to fade away in the obscurity of the town to fend for themselves, and they had to be caught on the boat itself. Newspaper men, photographers, each and all foraging for items of interest. Lost dogs of every description, Russians, Americans and Scandinavians hurrying back from their broken holidays. Each and all required help.

Would be recruits of all nationalities presented themselves, including an inebriated Frenchman who wished to join our Cavalry—"because I see your Derby every year," as he expressed it. The beautiful lady serving the bar at the Christol laconically remarked "Alcoolique." A Methodist parson, who was arrested in the Square for preaching against all war, was allowed to languish a few days in the French gaol before being liberated and sent off to England again. Spy rumours of every kind. Cement drying floors for nets, in positions just outside Boulogne, were reported as being feet in depth, and prepared as gun positions, mostly quite impossible positions too, even if the few inches had been actually feet. Winking lights were merely the arm of a French seamstress passing diligently between the lamp and the window. Not once did a rumour really develop into anything definite.

The most inspiring sight of all was perhaps the original Flying Corps passing over the Channel. Never had such numbers been seen before, like great white birds, as they made and turned Napoleon's Column in the bright sunlight, and continued towards Abbeville inland. Only one came down, through lack of petrol, and he damaged himself again in trying to take off a second time. The oddments were the greatest trouble of course, and we had only a few French carts as transport, and our promised lorries had never forthcome. The six Base Depôts, each of a Commandant, an Adjutant, a Sergt.-Major and a clerk with the inevitable box of Government stationery were almost the last to come, and were just in time to hurry back on the ship again. The only unit which failed to get through was a heavy battery, and this with the Base Commandants passed round to Havre, and thence to St. Nazaire, before they eventually affected a landing. Then the Staff of G.H.Q., Sir John French and Sir Henry Wilson, wearing the Order of the Legion of Honour at his neck, Sir William Robertson, the Quarter-Master General with a few questions about bread rations, and his sharp "Is that really right, or are you guessing" to a glib answer in round numbers.

Almost one of the last wires to arrive was a curious one: "Prepare for goat-farm, 5,000 arriving 'Stella' Monday." This caused a deal of conjecture until some bright being suggested that only the Indian Army could require the old "bakri," and so this was our first intimation of any Indian troops expected in France. A great space was duly wired in on the grassy cliffs away from the town, but the Base was evacuated before the occupants arrived. Such little items of news were all we had to go upon. Other news we had none, of the doings up at the Front. It would have been preferable had we been able to refute some of the extraordinary rumours which circulated at the Base, but we were woefully ignorant.

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These rumours from the Front, came in the form of disjointed stories from despatch riders and liaison officers, and the faces of the French Staff Officers instinctively told us that all was not well at the Front. We had not the slightest idea as to where the Army had concentrated, so well was the secret kept. Anxious were the hours of waiting after the cessation of the arrival of transports and the change to deadly dullness from busy bustle. Then the feverish digging of somewhat indefensible trenches on the outskirts of the town by those same old Territorials who had first greeted us. We were in no way responsible for the defence of the town, but the Commandant took the bull by the horns, and the whole staff worked day and night to dismantle the camps and pack them in our only remaining ship. And then off by road in a couple of cars to Havre for fresh orders. No. X Base had served its purpose and was being closed.

Havre was still all bustle, though work had settled down somewhat. We spent our time inspecting the magnificent Hangar au Coton, down the centre of which one could drive a coach and four, and the various Camps round the outskirts, and comparing the arrangements with our own smaller effort at Boulogne. Great barbed wire camps were standing empty with instructions in German everywhere, but as yet there had been no prisoners. Days of enforced idleness were these, and then at last an order to go South and select a new Base to replace both Havre and Rouen if necessary.

Day and night we travelled southwards, finding eager questions everywhere, but no one had an inkling of what was really going on at the front. At Angers, our cars were surrounded by a cheering mass of soldiers and civilians. My red hat was taken for a Russian hat, and there was an immediate cry of "Vive les Russes" to be changed to "Vive les Anglais" when our identity was discovered.

It was impossible to explain our real purpose and so we called ourselves a "Mission Anglaise" and left it at that. We had to remain for supper at the "Cercle des officiers" under the presidency of the Sous-Préfet, hurriedly summoned to meet us. But, at last we were away to Nantes. Stanley Weyman is a wonderful writer, and the whole town seemed familiar at once, the atmosphere even remaining the same in this wonderful old town. We had the greatest of difficulty in settling how to work here. To report to the French authorities would have meant endless delay and explanations, which we could hardly give without knowing first how much they knew. And so, very wrongly, we decided to go to work with lower officials. Details of Ports in France are in the hands of a gentleman calling himself Director of Ponts et Chaussées, and we found a most obliging civil engineer ready to take us at our own valuation and give us all the information necessary. The Commandant competed with him, whilst I rushed off to make a hurried personnel reconnaissance of the Port. Here was the reality after so many paper schemes, and never did Staff College training prove more useful—depths of channels, cranes, railway sidings and all the necessities of landings came rushing back into one's mind. I had just finished when a frantic messenger caught me up to say that I was to parade at once at the "Place," and meet the Commandant. On arrival there I found the Com-

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mandant, and together we were haled in front of General G. a small grey, fierce-looking little Frenchman in a braided jacket, wearing the Star of the Legion of Honour. The very personification of a General of 1870. He was furiously angry at having been ignored, and it was difficult to explain that we had deliberately acted as we had done in order to save time. We had been unpardonably rude and unjustified in what we had done, and felt like naughty boys. The little General evidently had his suspicions of us, for he confronted us with a young Naval officer, who had been sent to meet us, but whom we had never seen. We had no papers of any sort or kind, except our motor passes to travel in France, and we could offer little explanation. I was further accused of speaking French too well for an Englishman, and it was of little use in explaining that I was really a Scotsman, and did not at any rate speak with a German accent. The General did some telephoning, and at last became satisfied that we were not spies, and we let him a little into our secret, which perturbed him not a little, more telephoning and we were allowed to continue to St. Nazaire, with a warning against doing anything so foolish again as ignoring the French authorities. We parted really very good friends. I think, however, that we did save a good deal of time, if we did get a wigging.

At St. Nazaire we separated. I remained to reconnoitre the port, while the Commandant went on to La Rochelle, which he eventually found was unsuitable.

On his return, a wire was sent saying that Nantes and St. Nazaire were recommended as the new ports, though not of the same value as the former ones, Havre and Rouen. Now came our trying improvisation. We had no set programme, no French opposite numbers, no maps, and ships were expected at any moment.

The Commandant rose to the occasion and proved his claim to be regarded as one of the finest administrators of the war. Not only were the ordinary ships coming direct from England, but also Havre and Rouen were being cleared and passed to us. The latter ships were loaded in a hurry, the stores and units in any order, higgeldy-piggeldy one on top of the other, and no manifests to say what they were. The Loire would only take ships of moderate draught, and St. Nazaire contained only berths for 7 ships of large size. The berths were reached through a lock to be operated at two tides in the twenty-four hours and a lengthy job at any time. It was decided that supply ships, usually the smallest, should go up to Nantes, whilst personnel and equipment remained at St. Nazaire. Two of the Staff College Students were deputed to live off the port in small launches, boarding the ships and trying to find out what they were and what they contained. Skippers and O.C. Troops were naturally all too hazy, for no one there had been responsible for priority of order of loading. It was impossible to keep pace with the arrival of ships at first, and there was much delay, some weeks in fact, before this system could begin to work properly.

The accommodation in this little town was all too small, and the French Colonel in charge was at his wit's end to meet all our requirements, which he could not even imagine. He failed to realise

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that all the requirements of the British Army were being met here. He never ceased to tell me that I was "Trop exigeant" but by dint of cajoling and entreaty, I generally managed to get my way. It was difficult for these Provincial French authorities, who did not even realise that a retreat was taking place, to picture the immensity of our problem and the need for haste. We got possession of the town-hall, and unluckily, someone burst into the Mayor's own room and I was confronted by a frantic man shouting "Vous êtes pire que les Bosches" "Ce n'est pas un pays conquis" who took hours to pacify. Then began the struggle to supply the needs of the Army after the retreat. Wire after wire came in to send up some particular store "All the machine guns" "all spare parts for 18-pdr. guns" "all the 60-pdr. ammunition." And where to find these? A ship, once into the Bassin, had to be unloaded in toto, or time would be lost in shifting her out to make room for another. We had no labour except what we could get from the French authorities. The stevedores were over-worked, and had to be paid double to work any more. There were mistakes in ships coming in, and delay of every sort and kind. One morning, a precious berth was taken up by a ship whose main cargo turned out to be "Daily Mails," free copies presented to the Expeditionary Force and of little value at the moment.

Ships arrived and lay outside in the river, and wires came in from home that they must return priority to England, although their cargo was not granted priority ashore, and so many other things were. The cipher work was prodigious, and often the ciphers used were different to our keys. We had no separate cipher staff, and all and sundry had to take a hand at deciphering as each came in. Two ships even arrived with gifts of hay from the Canadian Government and demanded to be allowed to unload. Hay, as can be imagined was not priority, and I was driven wild each morning by the sight of the two Canadian Skippers. A fire on board eventually solved the difficulty of unloading, and regrettable to say, the Loire received the gift instead of the British horses—but the ships were released for more useful work. Hospitals with tons of valuable stores were discovered on the top of all boats, how could it have been prevented in the hurry at Havre? It was wonderful how so much was actually loaded. Work became a perfect night-mare and one never had one's clothes off. Luckily the weather remained fine and unbroken, and the Naval authorities worked without a hitch. Stragglers and wounded began to come down from the front, many in terrible distress after the long train journey, and to crown all reinforcements began to arrive from England. St. Nazaire is built upon a swamp, dry in summer, particularly so in this year, and for the moment presented plenty of open ground for camps. But, one trembled to think of the state of these "marais" should only a little rain come down. Luck was with us and it never rained.

There was another side to things, and that was drinking water—the reinforcements and camps of stragglers from the Retreat swelled at one time to 25,000 men, and all had to be supplied with water. The main reinforcement camp was situated about three miles out and right on the coast. The weather being hot, the men spent most of

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their time in the sea, which reduced the desire for water to drink. Great barrels were mounted on wheels, and a regular water-service made to the camp, but the barrels were always emptied immediately and we were never able to create a reserve in the camp. The camp was naturally a great place of interest for the local inhabitants to visit, and stare open-mouthed at the English soldiers, and à propos of the bathing, I had an amusing incident with my friend the excitable Mayor. He burst into my office one day saying that it was "incroyable" and that the "pères and mères de famille" were "offensés" to see the nude soldiers. Would I at once order all bathing to be done in "costumes." It was against the law of France, etc., etc. I pointed out that we had thousands of men there, and no "costumes." Would the "jeunes filles" who were obviously the cause of all the trouble set to and make the "costumes" which would then be worn by the soldiers. I heard no more about it.

These reinforcements were a great trouble. They were all old soldiers', reservists, and under young officers of no experience, whom they had never seen before, and discipline under the conditions of uncooked food and lack of water became very lax indeed. It was not till large batches of unattached officers arrived, that good discipline could be restored.

The cases arriving at the Base were of different kinds. Stragglers, worn out in boots, and suffering from shock and debility from the long retreat, were often a pitiable sight. Most of the men had torn off their heavy underclothing, owing to the intolerable heat and had to be completely re-equipped.

It was almost impossible to believe that these were the same men who had passed up so gaily, singing that they were not downhearted, only a few weeks before. Cases of tetanus and gangrene proved very heavy, and a regular system of injections at the advanced stations was organised at once, with immediately successful results in the cases coming down.

Unauthorised and sometimes misguided helpers embarked individuals officers and men in private yachts, cases being actually lost until discovered again in England. It was useless to explain to these people that there must be a regular evacuation of sick and wounded or the result would be chaos. There were so many eager helpers.

One had to deal with each situation as it arose. Many were amusing, if one could but have had time to stop and laugh. One morning, I was called by a panting bicycle orderly, who could only ejaculate "They've come, they've come." Following his disappearing figure, I came to the main entrance to the Railway Station, to be stopped by a large and important matron holding up her hand and saying "Now, please don't get excited." Dear lady, if she had only known that one was past being excited by anything. In the middle of the big station sat some hundred poor nursing sisters, each on her little handful of luggage. All dishevelled and very tired. They had spent hours in the train from Havre, days in fact, and were almost exhausted. The good matron exhibited a stumer cheque on Amiens for 1000 francs as the sole means of subsistence. This I at once liquidated from my ever useful pocket of French notes, but what to

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do to help was difficult to decide. Luckily, my eye fell upon a Padre, the very man, and I enlisted him to prepare a temporary cup of coffee while I thought out a plan. Along the coast from St. Nazaire were small sea-side resorts, each with its little Casino.

A train was leaving almost at once, and so the sisters, escorted by the padre left for the nearest Casino, where they could get the rest they wanted. At a later date, I was called up about the hiring of this Casino. Why had the sisters needed a Casino? The questioner in his office must have pictured the good sisters manipulating "the little horses" on a green table.

The transport for the Indian Corps arrived, for forwarding on to Lyons I can still see them in my mind's eye. All "R. Stone" mineral water carts in red and green and gold. Men and horses had been collected in a hurry at two Depôts at Deptford and Islington. None of the men had been in the Army before, and many were most inferior carters. Their officers were from the Indian Supply and Transport, presumably caught on leave in England at the outbreak of war. They were to be drafted to the Lahore and Meerut Divisions upon arrival, and unfortunately the parties from Deptford and Islington did not correspond to what they were eventually to be. I stupidly made an attempt to sort them out, but the more I got them into Lahore and Meerut, the more did they resort themselves into Deptford and Islington, as the Indian names were naturally meaningless. Any man who succeeded in getting illicitly into the town, and enjoying himself, naturally managed to join up with the first Deptford or Islington man he found. It seems stupid, but resorting became almost impossible. There were no nose-bags or picketing gear, and the wretched horses were tied in rings with rope bought in the town. Watering and feeding arrangements under these conditions can be imagined. We were glad to get rid of them, and the final train was a regular round-up of escaped men and horses, wagons without poles, and odd bits of harness. When all were stuffed in, and the train was ready to go, I was assailed by the last of the officers, who approached me saying "When I left Islington . . . ." But, I had heard enough of Islington, and realising that he was going to complain about something, I unceremoniously bundled him into the nearest truck, and the train left. I pitied the poor devil, who had to unload them and really sort them out.

The first German prisoners were a sorry looking lot. They came down from the front escorted by half a dozen or so unfit men. At the moment, it struck one as curious that they all wore British cap comforters, until one realised that Tommy was collecting Pickelhaubes as Souvenirs. The French population was naturally interested and not a little hostile to the prisoners. They had to be housed in sheds on the docks, and marching through the streets with their meagre escort of Britishers came in for a good deal of booing and some assaults. Registration was done in the sheds by two German speaking Frenchmen collected from local offices, the British registration section not having any German speaking members in it, which seems curious to say the least of it. There were no escorts to send home with the prisoners, so they were split up in small batches on every

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ship going home. As work would be a preventative against mutiny, each party was given orders to clean the ship thoroughly during the voyage home. One can imagine the British seaman's delight, and these prisoners were of the greatest use in the horse-boats, the skippers of which always came and asked for a further batch each new journey. The German officers were more trouble and many had to be locked in their cabins, through refusing to give parole or obey orders.

One incident, pathetic in itself, gives a good idea of British pluck and determination, which struck me very much. A small man of over 50 years of age was introduced into my office on urgent affairs. He had come out from England in a tramp steamer, and explained that he was a biggish business man in the North of England. His son, a subaltern in a British line regiment was missing in the Retreat, and he wanted permission to go up country to look for him. "I cannot sleep at nights, thinking of my poor boy lying out there." I tried to explain how hopeless it all was, but finally allowed him to be smuggled up country by a military train. This little man actually succeeded in passing through the lines and in reaching Belgium, where he found his son in some farm-house and succeeded in getting him to England. He wrote me one of the nicest letters I have ever received. As an example of pluck this incident will take a lot of beating.

The arrival of the Siege Train of two 6″ howitzer batteries was a great event. Pulled by great Foden lorries they proved difficult to entrain, and one wondered how they would get on over soft ground with their smooth iron wheels. They were indeed of inestimable value and the first battery managed to expend so much ammunition that we were urgently required to send up the supply belonging to the second, before the latter was entrained. This siege Train had some of the finest men I have even seen in the Army. Incidentally the Colonel of the Siege Train borrowed my bicycle, my sole means of getting about, and his servant must have taken it away, for I never saw it again.

The landing of the 6th Division in organised units was a great relief after so many oddments, and one felt that this Division had had an opportunity of pulling itself together, and would give a good account of itself. It contained some officers who distinguished themselves later in many ways. Jack Keir, Bill Furse, Rajah Paget all Gunners—Walter Campbell, Jock Burnett-Stuart, Walter Congreve and many others.

With the departure of the 6th Division and a great part of the reinforcements, work began to settle down into ordinary routine, and one had time to look around one. Every little foundry in the neighbourhood of the port was busily engaged in turning out small lots of 75 shells.

One had it borne in upon one that the manufacture at least of the 75 ammunition and fuze was a simpler matter than of the 18-pdr. It all looked very crude, but seemed to serve the purpose well enough.

The traffic from St. Nazaire to Algiers and Tunis was still continuing by the Transatlantiqus boats, and at least one distinguished Frenchman, in the person of General Bonnal, passed south in the

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search for health in his old age. If the war had come only a little earlier, this magnificent soldier might have had an opportunity of exercising his teaching.

The communiqués, placarded in the Square, were our only means of knowing what was going on. We had none whatever from the British zone, and could only judge by the numbers of sick and wounded and prisoners coming down. There was a distinct air of relief. Things were evidently going better. This absence of news was often a serious matter, and impressed upon one the necessity of spreading accurate information to prevent useless and harmful rumours so prevalent at the Base.

The marshes round St. Nazaire were teaming with snipe, and in default of shooting, the Commandant and I used to go out with our sticks and make pretence of how many birds we brought down.

At last the welcome news that we were to go north again, leaving the Base in the hands of another officer. We found Rouen just commencing again, but after a few days were pushed on once more to Boulogne.

The journey to Boulogne brought us through the troops coming up form the Aisne and passing on to the coast. One was struck by the very attenuated regiments. They were remarkably spick and span, but there was an air of unutterable weariness in the men's eyes, which one sees after strenuous fighting, and where no reinforcements have been brought in to fill the ranks. It made one proud to think of what these regiments had been through and still remain so fine.

Boulogne was to be opened again upon a larger scale than ever. The old Governor Colonel Daru was there to meet us, débonnaire as ever, and ready to help us in everything. The Base began to spread itself over everything, more and more buildings being requisitioned for Hospitals and medical stores. We were now thoroughly well equipped, and I well remember the surprise of the French Staff, who could only ejaculate "Quel luxe." British administration in these matters takes a deal of beating. Contracts for buildings presented considerable difficulty. How long was the war going to last? What were to be the conditions of release and eventual replacement? Hotels resisted requisition for Hospitals, considering that their trade would be thereafter damaged by having been contaminated by sickness, but the Mayor and the Governor helped us in every way. His continual advice was "Ne vous laissez vous pas exploiter." Even the goat-farm was resuscitated and fully stocked.

The Indian wounded were of the greatest interest to the population.

With the reopening of the Base came many society ladies, each backed by an influential committee and large supplies of money. One had to exercise the greatest tact in dealing with these good ladies. They were all eager and impatient to get to work, and it was useless to explain that several military hospitals, fully equipped, were waiting in boxes for orders to open, and that they must naturally have priority of claim. I was even accused of jealousy by one lady who said "Aren't you very selfish, taking all these buildings for your-

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self."? One of the most famous of these private enterprises was the buffet at the Quai at Boulogne, and this did marvellous work.

The town became crowded with Belgian refugees, coming in by ship and motor. Several Belgian regiments arrived in a state of destitution and had to be fed from our iron ration supply.

There seemed to be no end to what we were required to do.

Boulogne became to all intents and purposes a British town, long to remain so. Relations with the population were always of the most cordial at all times.

By this time, I really felt like the last of the Mohicans. All my brother Staff College Students had gone off to various jobs in Staffs or Regiments. Even the Adjutant of the Staff College, Major Brewis, had passed through with his cheery smile, and one began to despair of ever being released. But, at last, a new Base Staff arrived from Zeebrugge after the disembarkation of the 7th Division in Flanders, and I was to be allowed to go up forwards.

Three months of crowded work had been full of interest, with little time to ruminate. Sad to hear of one's friends disappearing, one still consoles oneself with the idea that one was at least filling a gap which was necessary in the chain of military work.

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THE COCKPIT OF THE WORLD.

BY MAJOR-GENERAL G. McK. FRANKS, C.B.

The problem of the Near East, like all great problems of that nature, has its roots deep down in history, so deep down that it was old when the horse-tail banner of the Turk first appeared on the Bosphorus. It was indeed no new problem when Xerxes, from the little hill above Chanak, watched his army cross the Dardanelles, at the very spot where now a small British force is maintaining the freedom of the Straits.

Flanders and the Low Countries have long been called the "Cockpit of Europe," because we and our neighbours have fought out our family squabbles there for the last few hundred years.

Thrace, Macedonia, and Asia Minor, however, have been the Cockpit of the Western World, not for centuries, but for thousands of years. For the reason of this we must look at the map: on the one side we see the ancient continent of Asia, and on the other side the comparatively younger continent of Europe. Joining these two, we see a kind of bottle neck between the Red Sea and the Caspian, while to the North of the Caspian lies a great region of swamp. This bottle neck was therefore the only possible route from the old continent to the new, and through that bottle neck passed the millions of emigrants who left the old homeland in Asia to seek a new one in Europe.

In ancient times, ages before the dawn of history, the steppes and deserts of Central Asia were seas and cultivable lands, which carried a teeming population. Asia was the seat of great nations long forgotten, of whom traces are now being discovered in the most unexpected places.

Asia, as we know, was the homeland of the Aryan race, and as Asia withered, her seas dried up, and her fertile land became desert, horde after horde of Aryan emigrants poured westward through the bottle neck between the Red Sea and the Caspian into Europe. Part of these hordes settled in Arabia and Persia, establishing ancient Aryan Civilizations and Empires, and part swept on into the Caucasus, and thence North and South of the Black Sea into Europe. It was then that the problem of the Near East began, when East and West first met, and what is now Constantinople became the vortex of this swirl of movement, the impact of new races upon old.

Round Constantinople, in Asia Minor, even in Greece, we still find remains of building work more ancient than that of ancient Greece. gargantuan walls of immense stones, relics of more ancient builders and prehistoric fortresses.

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We can picture this westward march of the Aryan emigrants; the Teutons North of the Black Sea, fighting their way over river and swamp, through South Russia and into the Balkans; where they are now found in the Slav races, Croats, Serbs, and Bosnians; and the Celts along the southern shore of the Black Sea, dropping colonies as they went in the Pontus and as far South as what is now Smyrna. We find as early as 800 B.C. the record of flourishing Greek cities at Ephesus and Miletus.

It was no holiday excursion, that march of the Celts, meeting en route the stubborn ancient races of Anatolian highlanders and driving them further up into the fastnesses of their native mountains. Of all these ancient races only the Armenians have retained their distinctive characteristics. Cappadocians, Hittites, Phrygians, and others have long since become merged into the dominant races, and have no doubt greatly modified the type of the Turkish race from its Asiatic prototype.

About 500 B.C. we find the Greek cities of the Asia Minor coast in violent conflict with the Persian overlords of Anatolia, from which developed the long series of Greco-Persian wars, culminating in the defeat of the Persians and the overthrow of the Persian Empire by Alexander the Great at the great battles of Issus and Arbela in 331 B.C. In connection with this period it is interesting to note that, until the Greeks were welded into an Empire by Philip of Macedon,, and his son Alexander the Great, who were Macedonians and not true Greeks, the various states and even the great cities maintained a most jealous independence, and were indeed frequently at war with one another.

To this inherited spirit of disunion may be attributed the divided councils and bitter partisanship which have exercised so malignant an influence upon the recent fortunes of that unhappy country. Another point of interest is this, that even at the zenith of the power and extension of the Greek Empire, Anatolia was never really assimilated and made Greek. The actual Greek people clung to the seaboard, and established cities and colonies on the main routes of trade and commerce in the interior. From the time of Alexander down to the present century the characteristic occupations of the Greek have been trade, commerce, and seafaring. Though the influence of Greek civilization and religion spread through the country, especially the more accessible parts of it, the population generally were not Greek but the remains of more ancient races.

It was not under the Greeks, but under the Romans, that Constantinople shone forth for a brief period of glory as the centre and capital of the civilised world, the great christian centre of an empire which extended from Baghdad and Cairo to France and Britain. When the Roman empire split up in A.D. 395 into the Eastern and Western Empires, Constantinople remained the capital of the Eastern, or Byzantine, Empire, and the dry rot slowly and surely crept in, which led to its ultimate disintegration in face of the encroachment of more virile newcomers. On the Northern flank, the incursions of the Goths which commenced about A.D. 200 were the last of the Aryan western movements.

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It is to the influence of this tribe of Germanic stock that we may attribute the blue-eyed, tawny moustached type that may be found so frequently in the Balkans, fairer than the ordinary Slav. Tawny men are also to be found among the Turks, but that is due to the large importation of Circassian, Caucasian, blood.

The great invasions, however, which disrupted the Byzantine Empire were not of Aryan but of Turanian and Mongolian stock. The westward march of the Aryans was now long past and over, but as Asia continued to dry up and to turn more and more into desert she continued to discharge into Europe and Asia Minor horde after horde of nomadic tribes of a much more primitive type than the Aryans, Turanians, and Mongols, nomads of the steppes of Central Asia.

The first of these to appear upon the scene were the Huns, who swept into South Central Europe, but kept mostly to the North of the area under discussion. They were followed by the Avars, but by far the most important invasion of that period was that of the Bulgars, a Turanian race and therefore akin to the Turks, who passed North of the Black Sea and burst like a destroying flood upon the decaying Byzantine Empire from the North. The Bulgars first appeared about A.D. 600, and after centuries of terrific fighting with Romans, Byzantines, and the Slav races of the Balkans, finally settled themselves in what is now Bulgaria and Macedonia.

Time and time again the barbarian flood surged right up to the historic and ancient walls of Constantinople, which still stand in their ruined grandeur as they were left by the conquering Turk nearly a thousand years later. Meanwhile to the South of the Black Sea another race of Turanian nomads, the Seljuk Turks, were slowly and surely encroaching upon the Eastern confines of the Byzantine Empire in Asia Minor.

Driven out of their Asiatic homeland by the pressure of the Mongols, horde after horde of Seljuks passed westward, and little by little carved out the Seljuk Turkish Empire, which by A.D. 1200 practically extended westward to the Ægean.

It was these Seljuk Turks whom the Crusaders of the first and second Crusades encountered in the great battles of their march South from Constantinople to the Holy Land. Fresh blood continued to pour in incessantly from Asia, and in A.D. 1224 arrived a small tribe, destined later to make no small stir in the world, and to dominate a great part of Eastern Europe for some 500 years. These were the Osmanli or Ottoman Turks, so named from the famous Osman Ghazi, who succeeded to the chieftainship of the clan in A.D. 1288, that is to say during the reign of our King Edward I.

On their first appearance in A.D. 1224, this clan, under the leadership of Suleiman Shah, numbered no more than 500 horsemen. This small force of 500 determined fighters, however, made itself so useful to the now rather decadent Seljuks that it was given a small territory at Eskishehir, in the vicinity of the borderland of what was now left of the Byzantine Empire in Asia Minor.

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This unhappy Empire had been recently further undermined by the filibustering expedition known as the Fourth Crusade. The story is a sordid one of the machinations by which the Crusaders were diverted at Venice from their original pious object, and launched to the destruction and pillage of a christian city. Suffice it to say that in A.D. 1204 the city fell after a desperate and bloody siege, and it was not until sixty years later that a Byzantine dynasty was restored to rule over a much weakened Empire.

The Turk meanwhile had not been idle, and when Osman Ghazi succeeded in A.D. 1288 to the chieftainship of his clan they had augmented their territories and strengthened their position to such an extent that they had practically superseded their former suzerains, the Seljuks, and had left the Byzantines little more than a foothold in Asia Minor. When Osman Ghazi was on his death bed, Brusa, one of the few remaining Byzantine strongholds, was captured by his son, and a few years later the Turkish banner appeared upon the Bosphorus at Scutari, opposite Constantinople.

A Turkish legened relates how when Osman was still a young man he fell deeply in love with a beautiful maiden, whose face he saw by chance as she was feeding the fowls in her father's yard. His prospective father-in-law dreamed a dream one night, in which he saw a great tree grow from the loins of Osman, and it grew and grew until it seemed to overshadow the whole earth, and its branches dipped until they touched the waters of the Mediterranean on the one side and the waters of the Danube on the other. He read the vision aright as foretelling the great destiny of the house of Osman, and his beautiful daughter became the wife of Osman, and sleeps by his side to-day in the picturesque old tomb on the slope of Mount Olympus overlooking the lovely little town of Brusa. The great Osman was true to his one and only love and married no other.

It was Osman's grandson Murad who first carried the horse-tail banner into Europe, crossing the Dardanelles in rafts with a small party of eighty men, who seized the town of Gallipoli and installed themselves on the peninsula in A.D. 1354. By A.D. 1375 they had secured Adrianople, which shortly superseded Brusa as the Turkish capital, and in A.D. 1389 Murad inflicted a crushing defeat in the historic battle of Kossova upon the combined christian races, Serbs and Bulgars, with their other Slavonian allies.

Truly was this battle of Kossova one of the decisive battles of the world, when, as the christian historian put it, "the Turkish night set in," and for five hundred years the christian races of the Balkans lay under the iron heel of the Turks. The scene which closed this great battle was fittingly dramatic. The dying christian king was brought in and laid at the feet of Murad. A Serbian prisoner, one Milosh, begging leave to kiss the hand of the Conqueror in token of submission, plunged his dagger in his body, and himself fell struck down by the scimitar of the Turkish guard. Thus as the sun sank on that fateful day conqueror and conquered lay dying together on the ground in the royal pavilion of Murad.

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When we look back from the Peace Conference of to-day through the mists of five centuries we can feel little wonder that the Turks have strong ties of sentiment for Thrace, and have fought hard in battle and conference to retain the historic city of Adrianople, their first capital in Europe, where they have been installed since Richard II. was King of England.

Two generations passed and of the Byzantine Empire little remained but Constantinople itself. The realm of the last of the Byzantine Emperors was bounded by the grey old walls, which for a thousand years had shown so brave a front, when Mohammed II., the Conqueror, received at Brusa the news of the death of his father, the Sultan Murad II., in A.D. 1451. Leaping on to his horse with the famous words, " who loves me, let him follow!" Mohammed rode for Adrianople and his throne. It fared ill with sluggard princes in those days, and he who would claim a throne did well to forestall rivals.

The Turkish story tells how one night at midnight Mohammed sent for his grand vizier. Such a midnight summons boded no good. The careers of Grand Viziers were glorious and lucrative but short. There is a spot in the old Seraglio which is shown to visitors as " this is the place where Grand Viziers were beheaded." The trembling minister, on entering the presence, made bold to offer his royal master a magnificent diamond. Mohammed hurled it on the floor with " I want no such baubles. The jewel I require is Constantinople." On 29th May, 1453, the city fell, and Mohammed rode triumphant into Saint Sophia.

A Christian legend recounts that as Mohammed entered the great church, a priest was celebrating mass in the presence of a crowd of terror-stricken Byzantines. As the Conqueror approached, the priest, carrying the Host, disappeared into one of the great columns near the high altar. No subsequent search ever disclosed how he had escaped or where, but one day he will reappear with the Host, when a christian conqueror rides into Saint Sophia.

The high tide of Turkish conquest was reached in the reigns of Selim I. and Suleiman the Magnificent, contemporaries of Queen Elizabeth and Henry VIII. Selim added Palestine and Egypt to the Ottoman dominions. Suleiman captured Baghdad, conquered Hungary, and even marched up to the walls of Vienna itself, before he was repulsed by the Emperor Charles V. The Turkish Empire in Europe included Greece, Serbia, Southern Hungary, Bulgaria, Moldavia and Wallachia, and a great part of Southern Russia.

On the sea Turkish galleys swept the Mediterranean as far as Tunis and Minorca, and it was not until A.D. 1571 that the Turkish fleet was crushed, with the loss of some 250 vessels, at the battle of Lepanto by the Austrians and Venetians under Don John of Austria. This was during the reign of the worthless son of Suleiman and the famous, or infamous, Roxalana, his Sultana of Russian origin.

From this period onward we hear much of the baleful influence of the Janissaries, the pampered bodyguard and mainstay of the later Sultans, whose power became so despotic that practically in their

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hands lay the choice of ministers, and even Sultans, and the issues of peace and war. The Janisaries, which in Turkish is "Yenicheri," the "New Soldiers," in their inception in the 14th century were nothing more than a regular standing army, the first perhaps in Europe, well trained, well disciplined, and a force of great striking power in the hands of the vigorous and martial Sultans of earlier days.

Later it became the custom to enlist in the Janisaries youths of the christian races, thereby importing a degree of intelligence, and also capacity for intrigue, which were somewhat lacking in the more stolid Turk. Nor was this principle of enlisting the christian youth confined to the military service. From similar material something in the nature of a civil service was built up of boys specially educated for the work of administration, never a strong point with the Turk. It is to this that may be attributed the comparative excellence and moderation of the Turkish executive at the high tide of the power of the Ottoman Empire.

During the later years this system gave place to one of pure favouritism, or worse, and the highest administrative offices were filled by candidates who had neither the training nor the aptitude for them, and who, as the sunshine of favour was apt to be brief, were chiefly concerned in making hay while the sun shone.

The law of succession in the House of Osman put great power into the hands of the Janisaries. Succession does not pass from father to son, but on the death of a Sultan the eldest male representative of the house of Osman succeeds to the throne. If the eldest male representative of that house wished to succeed in due course to the throne, it was well for him that he should be a persona gráta with the Janisaries. In the case of one successful candidate we read that the Janisaries removed no less than seventeen rivals, or possible rivals, in order to clear his way. The royal Mausoleums at Constantinople are full of such princely victims, "égorgés comme des poules, enterrés commes des rois," as a French writer expressed it. The dramatic end of this powerful and turbulent bodyguard came in June, A.D. 1826, when Sultan Mahmoud II., the Reformer, caused them to be massacred by his newly formed regular troops.

Though the internal decline of the Ottoman Empire commenced at the death of the great Sultan Suleiman the Magnificent, it was not until over a century later that the decay showed itself in loss of territory. As late as A.D. 1683 the Turks attempted for a second time the capture of Vienna. The city indeed was in dire straits when in September of that year John Sobieski, with an allied army of Poles and Austrians, came to the rescue, and inflicted a crulshing defeat upon Kara Mustapha under the very walls of Vienna. The capture of Buda followed in A.D. 1687, and by A.D. 1699 the Turks had been driven back across the Danube; Hungary and Transylvania had been restored to Austria; and the Venetians, who played a leading part for centuries in stemming the Turkish advance, had secured Dalmatia and the Peleponnesus of Greece. The last-named, however, reverted to Turkey some thirty years later.

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The following century saw the retrogression of the Turks in South Russia, and by A.D. 1790 Catherine's great general Suwarof had driven them across the Dniester, while the Treaty of Kainardji had given the Russian Empress the right to protect the Greek religion and its Churches in Turkey, a fateful clause for the future relations of Turkey and Russia.

The final break-up of the Ottoman Empire continued apace in the 19th century, and culminated in the veritable land slide, at least as regards the alien portions, which we have seen in the 20th.

This period of disruption has been marked equally by the struggles of the subject races, Greek, Serb, and Bulgar, to free themselves from Turkish tyranny, by the clash of interests of the great European powers, and the inter-racial jealousy between the Balkan states, which has militated so greatly against their success. Where unity of purpose has been possible, even in the case of the Balkan states alone, the result has been short, sharp and decisive. But such unity has seldom been long maintained.

In the heroic struggle of the Greeks for freedom from A.D. 1821 to A.D. 1830 the issue was largely decided by the action of the British and French fleets at the Battle of Navarino in A.D. 1827. Serbia won her freedom for herself, Roumania and Bulgaria owe theirs to Russia; on the other hand the alliance with England and France saved Turkey in 1855, and the British fleet saved Constantinople in 1878. From the time when Catherine II. made her entry into Kherson under a triumphal arch inscribed "The way to Byzantium," Russian aims have been little disguised. France and England, with one small lapse during the Great War, have been equally determined to prevent the Russian occupation of Constantinople, or, in other words, as we say now, to maintain the freedom of the straits.

Austria long had a covetous eye upon Salonica, and Germany visualised a great German highway through the Balkans to Baghdad. Italy has not forgotten the Venetian dependencies of former days. The dramatic and unexpected successes of the Balkan allies, Greece, Serbia, and Bulgaria, in the Balkan war A.D. 1912-13 gave every prospect that the Turk would be driven finally from Europe, when the bone of contention of Macedonia threw Greeks and Serbs at the throat of the Bulgar.

The Turk marched out unopposed from the Chatalja lines, the last defences of Constantinople, to which he had been driven, and re-occupied Eastern Thrace and Adrianople, which a few weeks before had appeared lost forever to the Ottoman Empire. Similarly in A.D. 1923 we find the Turk back once more in Adrianople and the Treaty of Sèvres relegated to the waste-paper basket.

What is, perhaps, insufficiently appreciated, is the change in mentality which differentiates the Turk of to-day from the Turk of one hundred years ago. What is this "Nationalist spirit" that we hear of so much now, and whence did it arise? We hear of no nationalist spirit when the Turk was driven out of Hungary, when

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Greece and Servia threw off the Ottoman yoke, or when Bulgaria became a kingdom. On the contrary, the Turk accepted defeat, as he accepted victory, as the will of God, packed up his belongings and moved Southward and Eastward. In the last fifty years, hundreds of thousands of Turkish emigrants have crossed the Bosphorus back to their homeland of Anatolia. Yet with the landing of the Greek army in Smyrna in A.D. 1919, and its advance into the interior, we find a new spirit arising, the spirit of Turkish nationalism.

This spirit is due to something more than the fact that in Anatolia the Turk felt himself to be on his native heath. It is due to a new motive power, capable of countering the fatalism of the race, and inspiring a spirit of nationalism, which is a different thing from the spirit of conquest, which had led their victorious armies up to the walls of Vienna, but which had failed entirely to stay them in the hour of defeat.

This new motive power has its origin in the revolution of A.D. 1908, when political power passed from the deposed autocrat Abdul Hamid to the hands of the Young Turks, the Committee of Union and Progress. The Young Turk movement was initiated at Salonica, and owed its inception, not to true Turks of the old Ottoman stock, but to a people known in Turkey as Dunmays, of Hebrew extraction converted to Mohammedanism. We may call them "Turkish," in the same way that the designation "British" covers many inhabitants of these islands who have rendered distinguished service to the Empire, but whose ancestry is not dissimilar to that of the Dunmays of Salonica.

The government of Turkey then passed in A.D. 1908 into the hands of men who, for better or for worse, profoundly altered the mentality of the ruling class, and Turkey is ruled by a class and not by the people. It is with this class that we have to deal now, and not with the Turk of the old régime. That they are ardent and patriotic Turks no one who has had to deal with them can deny, and that they have inspired in the phlegmatic and fatalistic Turk a burning sentiment of nationalism is obvious. That they are suspicious, hard bargainers, and lacking in breadth of view is due to circumstances and environment. The future of Turkey is in new hands, and the possibilities are great if the new leaders can be guided into the paths which will make for the greatness of the nation.

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GROUND FIRE AS A SPECIAL CASE OF A.A. FIRE.

A review of Lt.-Colonel E. Pagezy's article on this subject in *Revue d'Artillerie*.

BY MAJOR T. C. NEWTON, D.S.O., O.B.E., R.A.

(Continued).

D. The special case of ground fire.

The bearing of the target being known, there are always two problems to be solved :—

The problem of the quadrant elevation and
The problem of the fuze.
The problem of the quadrant elevation.

Formulæ.

The author examines the approximate formulæ for correction due to non-rigidity of the trajectory used in ground fire and comes to the conclusion that with the 75 mm. gun when the difference of height between the target and the gun does not exceed 350 metres, the application of the following rule—

When the tangent elevation is less than 15°—no correction.
When the tangent elevation is greater than 15°—correction as laid down in the regulations

will produce an error in range which never exceeds the probable error given by the 50% zone.

Solution of formulæ.

(a) When the correction for non-rigidity of the trajectory is negligible.

Most sights give the quadrant elevation to the gun by simply setting the angle of sight and the map range. Nothing could be simpler when the angle of sight results from a direct measurement, but generally it has to be calculated from the two co-ordinates—map range and difference of height of target. From the date of the introduction of the millieme a simple division has usually been all that was required. The author bewails the fact that after inventing the millieme and disseminating it among all the armies of the world, the French artillery is about to abandon her child and will in future only speak in the obscure language of grades and decigrades. Even in the most urgent cases it will be difficult to open fire without making a written calculation or using a slide-rule.

(b) When the correction for non-rigidity of the trajectory is not negligible.

To get the quadrant elevation it is necessary to consult three tables and make one multiplication and two additions, all for a result whose accuracy leaves a good deal to be desired. The author discusses the improvement of these tables, and the use of graphic charts showing curves of quadrant elevation as a function of difference of

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height and horizontal range. He points out that such charts are excellent indoors but difficult to use in the field. Graphs on which the reader has to seek laboriously the fictitious point of intersection of an abscissa and an ordinate, each obtained by interpolation, must not be confused with apparatus like the A.A. tangent elevation dial which registers the point sought for by a simple setting of its two co-ordinates. A.A. dials are calculating machines of the simplest and most practical kind. They are field instruments which can be used either on or off the gun and which will, one day, undoubtedly be found necessary in some form or other for the whole of the artillery.

After discussing the case of air burst ranging and the problem of the fuze, Colonel Pagezy comes to the following conclusion.

Conclusion.

Two profound differences separate A.A. methods from those of ground fire.

1. The A.A. gunner uses rigidly exact formulæ.
   The ground gunner is content with approximate formulæ.
2. The A.A. gunner consults neither tables nor charts. He simply sets the data on his special apparatus and the apparatus carries out all the calculations.

The first difference will seem very unexpected to those who know that the A.A. gunner corrects to half a degree where the ground gunner corrects to three minutes. It is the ground gunner who seeks meticulous accuracy and the A.A. gunner who uses the most rigidly exact formulæ.

This anomaly is accounted for by the following facts.

(a) The approximate formulæ of ground fire are valueless in the air.

(b) In all the A.A. apparatus described up to now the gun is brought to the desired position by setting a pointer to a curve.

Approximate formulæ lose their raison d'etre, for whether the curves are rigidly exact or not the process remains the same.

Further, for A.A. gunnery the invention of this apparatus was a matter of life or death. We fire at the "future position" as if it was fixed, but it is a fixed target which is changed at every shot. A.A. fire is a perpetual switch. Every four seconds a fresh round and a fresh objective. Where should we be if we had to carry out an immense calculation every time? Some other method obviously had to be found and the apparatus which has been described is only a small beginning because it is based on a future position already found for it. A.A. calculations are more complicated than those of siege artillery. But stern necessity, and possibly also the tastes and training of the first A.A. gunners, led to the use of lightning methods. They said to themselves that their arm would only become what it should be when it could open fire with the rapidity of the horse gunner and the meticulous exactitude of the heaviest of heavy gunners.

It would take a blind man not to see that this must become the common ideal of the ground artillery and of the A.A. artillery.

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GERMAN MILITARY TRAINING.

BY BRIGADIER-GENERAL W. EVANS, C.M.G., D.S.O.

I. COMBINED TRAINING.

Fürung und Gefecht der Verbundenen Waffen,* September, 1921 (Conduct and combat of combined arms) has been reviewed in the *Bulletin belge des Sciences Militaires*, June—October 1922, and in the French *Revue d'Artillerie* April—August 1922, in so far as the use of artillery is concerned. Perhaps the most instructive notice is that of Major Mabille in the French *Revue Militaire Française* February 1923. The principal points in his article are as follows :—

(1) The manual is based on the effectives, armament and equipment of the army of a great modern military power, and not solely on the German Army of 100,000 laid down by the Peace Treaty (F.u.G. introduction).

(2) Only a few words are devoted to the infantry division, and the cavalry division, in F.u.G. §2. These are the " battle units and are furnished with all the means of carrying out their tasks independently."

But, in a marginal note the German High Command has fixed for War Game purposes the type of " divisions in a modern army."

The Infantry Division Comprises :—

3 regiments of 3 battalions = 9 battalions.
1 trench mortar company.
1 battery of infantry guns.
1 battalion - 4 companies, one of which is a heavy machine gun company (12 heavy m.g's and 9 automatic machine gun pistols). Each of the three other companies has 6 light m.g's and 6 automatic m.g. pistols.
1 aviation squadron of 2 flights, one observation, one artillery.
1 reconnaissance detachment of two squadrons—1 cyclist company.
1 section of 4 armoured cars :—

Total—360 carbines
166 rifles
18 light m.g's.
18 a.m.p's†
4 heavy m.g's

* In future referred to as F.u.G., the German abbreviation.

† Automatic m.g. pistols.

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1 Divisional Artillery .—
- 1 Field Arty. Regt. of 3 groups
- 1 Heavy Artillery Regiment of 3 groups, of which two are tractor drawn (calibres up to 8 in. How.)
- 1 anti-aircraft group (mechanical)
- 1 signal battalion (3 co's)
- 1 pioneer battalion

Total strength 880 officers, 19,550 men, of whom 8,000 only are infantry.

A Cavalry Division comprises :—

- 6 regiments (each with a squadron of heavy m.g's and a section of artillery)
- 1 battalion mechanically carried infantry
- 1 cyclist battalion of 3 co's and 2 sections of motor machine guns
- 1 heavy machine gun detachment of 3 squadrons (12 guns)
- 1 armoured car detachment of 3 sections of 4 cars
- 1 artillery regiment of 3 groups—
  - 1 group horse artillery
  - 2 mechanical drawn
- 1 aviation squadron of 2 flights
- 1 signal detachment
- 1 pioneer detachment

Total—138 heavy m.g's
54 light ,,
54 a.m.p's
48 guns

(3) Thus one sees units of *great fire power.*

(4) The principle of the *offensive* is very strongly adhered to in F.u.g., combined with *envelopment*, of which the various processes are gone into.

As Germany is, owing to the Treaty of Versailles, inferior to her enemies, certain German writers foresee remaining on the defensive until they can mobilise their national resources. Some, indeed, are prepared to face as a prelude to operations a retreat with the object of getting the enemy into a pocket which can be attacked on both flanks. This General Balk calls the " Rückzugoffensive," and sets great store by.

In support of his theory he quotes : Rupprecht of Bavaria's operations in Lorraine in August 1914 prior to the battle of Morhange, Joffre's before the Marne, and Hindenburg's at Lodz.

Major Mabille sums up as follows :—

So envelopment remains in the eyes of the Germans the ultimate end of all warlike operations. . . . . They still proclaim that the ideal way of realising it is by an overwhelming offensive at the commencement of a war : always the theory of a short war.

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But, he says, the Germans have realised that war has altered. War no longer merely involves armies but nations, and in future the complete mobilisation of nations takes time. Therefore a war may last a long time.

Hence a great part of the German manual is devoted to the defensive, which had previously been somewhat sketchily dealt with in combined training.

II. ARTILLERY TRAINING.

Major Laurent, in the *Revue d'Artillerie** of Feb., 1923, states that :—

Provisional Artillery Training (Ausbildungsvorschrift für die Artillerie) is appearing in the form of pamphlets, the first of which bears the date July 1, 1921, and consists of general instructions to serve as an introduction to the training manuals of the three arms, with two paragraphs added applicable only to artillery.

It is interesting to note that officers are asked to write articles on military subjects, history, foreign languages, etc. Officers are told also that they must have some knowledge of the political economy of the State.

There does not appear to be anything particular to note except that General Rohne says that Pamphlet No. 2 will be Firing Instruction, and will be applicable to all natures of gun. The laying and methods of fire having been standardised for field and heavy artillery.

Pamphlet 11, also applicable to all natures of gun, gives the composition of the battery in action :—

(a) The O.P. consisting of :
The officer conducting the series (in moving war, the B.C.)
The observing officer
2 N.C.O. observers—of whom one is clerk.
2 telephonists—trained signallers.

(b) The Command Post.
1 Officer
1 N.C.O.
1 N.C.O. telephonist
2 telephonists—trained signallers
1 N.C.O. from the wagon line

(c) The Wireless Post.
1 wireless officer
2 operators

(d) The Guns.
2 section commanders
4 detachments
1 artificer
1 medical orderly

* Le nouveau réglement de manœuvre de l'artillerie allemande.

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AMERICAN MILITARY POLICY.

Extracted from "Our Military Policy" by Lt.-Col. P. S. Bond, Corps of Engineers, published in "The Military Engineer" Sept.—Oct. 1922.

(The complete article appeared in two parts in "The Military Engineer" of July—Aug. 1922 and Sept.—Oct. 1922.)

Military Policy of the World War.

Our conduct of the World War was by far the most intelligent thorough, comprehensive, and efficient in our entire military history, or perhaps it would be more correct to say the *least inefficient.* To the student of that history it was a refreshing proof of the inherent good sense of the American people, their patriotism, and their ability to meet an emergency.

For the first time Congress placed the entire resources of the nation at the disposal of the President and the military authorities, and voted funds without stint or hesitation. Throughout the war the President was virtually a military dictator, almost free from any hampering restrictions upon his conduct.

Our policy for the World War was, with perhaps one notable defect, probably as effective a policy as could have been adopted in our state of unpreparedness. Granted that we were unprepared, almost all the mistakes of the past were avoided. Chief amongst the wise measures taken were the following :—

1. The prompt passage of a draft or compulsory service act and concomitant *discontinuance of voluntary service.*
2. Ample funds and ample powers granted to the President as the constitutional commander-in-chief, *from the outset.*
3. Appointment of a supreme commander of all military forces in the field.
4. Enlistments *for the war.*
5. Expansion of the Regular Army.
6. Appointment of all officers by Federal authority.
7. A liberal and effective use of trained regular officers to instruct and lead the new levies, not only as brigade and division commanders, but *in all grades.* Even noncommissioned officers were thus employed, great numbers of them being given temporary commissions.
8. Recalling to service former officers, including retired officers fit for duty.
9. An effective organization of large as well as small units, uniform throughout the Army.
10. Provision for replacements to keep all units up to strength.

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11. Systematic and comprehensive measures for the mobilization of material resources.

12. Appreciation on the part of Congress and of the nation at large of the magnitude of our task, resulting in liberal provisions for almost every phase of our participation, in sharp contrast to the pennywise procedure of the past.

The reasons for all this were many, but two chief reasons may be mentioned. First, we had for some years been observing the war, and had formed some conception of its magnitude and severity and some appreciation of what was expected of us. Second, our Allies sent to America some of the ablest officers and civil officials to plead with us to avoid the mistakes of the past, and adopt from the outset a sound policy for the effective prosecution of the war. To the credit of Congress be it said that it harkened to the wise counsel of our Allies.

The notable defect of our policy, to which reference has been made, was one of which our previous experience had given us little warning. It was the failure to draft our citizens for necessary non-military as well as military service, and to fix maximum limits of prices for wages and materials. While the soldier who was drafted went to the front and risked life and limb at a dollar a day and board, the man who was not drafted stayed at home safe and, taking advantage of the nation's need, demanded and received unheard of wages for his services. Mechanics in the ship yards received higher wages than the naval constructors who designed the vessels. A negro coal heaver in a hospital received greater compensation than the expert operating surgeons. This produced a spirit of discontent amongst the soldiery, and substituted greed and selfishness for patriotism amongst the workers at home. It was largely responsible for a lowering of moral standards, inflation of prices for all commodities and services, and the subsequent period of painful deflation and readjustment following the war.

In time of war every citizen of the state, woman as well as man, is under the obligation of service. This should not be construed to mean military service alone but should include *all* necessary service. From those registered under the draft should be taken all necessary soldiers, and all men needed for the construction of cantonments, manufacture of munitions, operation of railroads under government control, etc. Thus only do we achieve truly democratic service, in which patriotism and not greed or "profiteering" is the ruling spirit. Men drafted for industrial service should be organized and disciplined on a military basis, the same as soldiers.

Probably the most striking feature of the war and certainly one of the most splendid things in our history, was the patriotic fervor with which our people accepted the draft. There was practically no resistance offered. In view of the active opposition to the draft in the Civil War, how may we account for this? The reason is not far to seek. In the World War the nascent patriotism of our people had not been prostituted to the evils of voluntary service, short term enlistments,

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and the bounty. But as the war progressed the bounty was with us again, this time in the form of outrageously inflated wages for non-military service. The evil suppressed in one place bobbed up strongly in another. And the evils of inflated compensation were by no means limited to the labouring classes. The failure to fix prices permitted many merchants and manufacturers to fatten off their country's need while their comrades in arms were making the supreme sacrifice.

Once we had entered the World War we prosecuted it with a broad minded intelligence that one familiar with the temper of our people and the history of previous wars could hardly have expected. Nevertheless our progress was painfully slow, and Germany all but succeeded in overwhelming our Allies before we were able to bring our strength to bear. This was due to the fact that a large part of our energy was devoted to preparation, including experiments, which should have been made in time of peace.

Our entry into the war found us in our usual pitiable state of unpreparedness. Such advantages as we did enjoy were almost entirely due to the fact that we had for some years been actively engaged in supplying munitions to the Allied powers. Our industries were well prepared to "carry on" in supplying munitions, but this was in nowise due to any intelligent foresight on our part.

In spite of the fact that for several months prior to our actual declaration of war it was apparent to all thinking persons that our intervention was highly probable, if not certain, yet it was six months after our declaration before a single American division took its place in the line of battle (Oct. 1917). It was fifteen months before American troops took any decisive part in the conflict (July, 1918), and *seventeen months* before an American army, commanded by American officers, engaged in battle (September, 1918). And this army numbered only 1,200,000, although we inducted 4,000,000 men into service.

When the war opened we had but 900 pieces of artillery, all of antiquated pattern, hardly a quarter of the number required to equip the 42 divisions sent to France. Our Allies were obliged to furnish the artillery necessary to equip our armies. We had only 600,000 rifles of our own pattern, and were quite unable to produce any more within any reasonable time. And so we were obliged to adopt the British rifle, modified to shoot our own amunition. We had practically no machine guns nor automatic rifles, nor did we begin to produce on a large scale until nearly a year after our entry into the war.

Although Congress, on July 24, 1917, voted $640,000,000 for aviation, the largest appropriation ever made for a single specific purpose, American aeroplanes never appeared on the front in decisive numbers. Only 196 were in action at the date of the Armistice. As with our artillery, we were obliged to depend on our Allies for this important equipment.

More than half our troops were carried to France in Allied ships and a large part of the remainder in captured German ships.

We put into battle many green men with only a few months training, some of whom had never been taught to shoot a rifle. Very

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few of our divisions, even at the close of the war, were entitled to be called first class "shock" troops.

The vital significance of the foregoing facts to the American people is this; in a popular war, with a united people and a thoroughly awakened government bending every effort towards effective preparation, it was *almost a year and a half* after the declaration of war before we were able to place an army of 1,200,000 partially trained troops on the field of battle, and we would have been unable to accomplish anything approaching this comparatively small achievement except for the assistance of our Allies, who provided a large part of our most important equipment, and held the enemy in check while we prepared.

The World War, like all our previous wars, found us unprepared, pitifully and hopelessly unprepared to stand on our own feet and face our enemy. Had we not been allied with two of the greatest military powers on earth, had we faced our foe alone, we would have suffered a swift crushing and a ruinous defeat, and have found ourselves at the mercy of a merciless conqueror.

These are not pleasant facts to relate. They are not flattering to our national vanity. But the truth should be told. Do we not tempt fate in assuming that the favourable conditions under which we entered the World War will be repeated at our next and all future conflicts?

* * * * * * * *

Military Policy Following the World War.

Following the Armistice of November, 1918, the great war army was demobilized and in June, 1920, Congress passed an Act for the reorganization of our military forces. This legislation took the form of amendments to the National Defense Act of 1916, and presumably embodies the lessons of history as understood by Congress. It will therefore be of special interest to consider its provisions.

Military men, including both those in the army and those now returned to civil life, are almost unanimous in their belief that universal military training for our young men in time of peace is by far the most essential item of an effective and economical military policy. But the prejudice against any form of compulsion in time of peace remained so strong that Congress promptly and unhesitatingly rejected all measures for universal training, thus declining to accept the most important lesson of the War.

Nevertheless the military policy of the Act of 1920 represented a great advance on all previous military legislation in time of peace. The principal provisions of the Act were as follows:

A Regular Army of 280,000 men, 17,000 officers.

A National Guard of 428,000 officers and men, largely under Federal control.

A Reserve of partially trained men, to include an officer and enlisted reserve, to be created chiefly by the training of young men in schools and colleges and by voluntary training at summer camps of instruction.

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Territorial organization of the United States into army and corps areas, on a basis of population, details being left to the President. Each corps area as organized under this provision is intended to include ultimately:

1 division of regulars at peace strength;
2 divisions of National Guard at peace strength;
2 skeleton reserve divisions;
Necessary corps troops.

Each army area to include—

3 corps as organized above;
Necessary army troops.

Two most excellent provisions of the law, plainly indicating an effort to profit by the lessons of experience are as follows:

All enlistments in force at the outbreak of war or entered into during its continuance, whether in the Regular Army or the Enlisted Reserve Corps, shall continue in force until six months after its termination, unless sooner terminated by the President." (This provision, if adhered to, does away with the evil of short enlistments from which we have suffered in the past).

When Congress shall have authorized the use of the armed land forces of the United States . . . the President may . . . draft into the military service of the United States to serve therein for the period of the war or emergency, unless sooner discharged, any or all members of the National Guard . . . all persons so drafted shall . . . stand discharged from the Militia . . . . The commissioned officers of said organizations shall be appointed from among the members thereof . . . by the President.

(It will be noted that this provision, excellent in several particulars, deprives the President of the power to assign Regular officers to duty with National Guard Units.)

The Act, as we have noted, makes no provisions for compulsory training in time of peace, nor for compulsory service in war. Aside from these defects it includes practically all of the constructive features recommended by the War Department, and is on the whole the best military legislation we have ever had. Details of organization, etc., are very wisely left largely to the decision of the Executive.

In promulgating this law, the President, in June, 1921, issued the following statement:

Our present National Defense Law establishes an economical and democratic military policy thoroughly consistent with our national traditions. It provides for a small Regular Army, to be augmented by great citizen forces in the event of national emergency. This is our traditional military policy. But whereas in the past these larger war forces have been extemporized after the occurrence of the emergency, the new law wisely provides that the framework of their organization shall be established and developed in time of peace, in so far as this

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is practicable through the voluntary service of our patriotic young men. The Army of the United States as defined in the new law comprises the Regular Army, the National Guard, and the Organized Reserves. Every patriotic citizen should encourage the development of these forces, each within its proper sphere.

In general the purpose of the law is to perpetuate at least the framework of the great army which we organized for the World War. It provides for a sufficient number of regular officers to carry out the organization and training of the reserve forces provided for. It contemplates the organization of our war forces by an orderly expansion of units organized in time of peace instead of extemporizing the new forces chiefly from raw material after the outbreak of war.

However, the Act of June, 1920, is not, in itself, a military policy but only an authority for such policy. Legislative sanction does not create an efficient military machine. The success of the policy which may be developed under this act depends upon the wisdom and energy of the War Department, the voluntary response of our patriotic citizens and finally upon adherence to the Act on the part of Congress and the appropriation of sufficient funds to carry out its provisions.

Unfortunately, ever since the passage of the Act the War Department has been hampered in carrying it out by the failure of Congress to provide sufficient funds. Appropriations have been steadily and consistently whittled down in response to the demand for economy. Not only that but Congress has also enforced a gradual reduction of the Regular Army. Very recently Congress passed an act reducing the enlisted strength of the Army to 125,000 men, or 45 per cent of that provided for by the Defense Act of 1920. By the same act the strength of the commissioned personnel was reduced from 17,000 to 12,000. The appropriations asked for by the War Department for summer training were cut as follows:

For Citizens' Military Training Camps, from $2,700,000 to $1,800,000
For Reserve Officers' Training Camps, from 4,000,000 to 3,100,100
For the National Guard, from .....30,000,000 to 25,885,200

These drastic reductions necessarily disrupt the plans of the War Department for realizing the military policy which Congress itself has authorized. It is to be hoped that this policy of retrenchment will not be persisted in, as its effect would be in a large measure to deprive the country of the benefits of the intelligent legislation of 1920. At the present time the Regular Army is far below the minimum strength at which it can perform its functions in time of peace. Very little progress has been made in the organization of reserve units.

The response of our young men to the invitation to attend the voluntary Citizens' Military Training Camps has been most enthusiastic, and there has been reason to hope that ultimately it would be possible to give 100,000 young men a month or six weeks training each year. It has, however, been impossible to take proper advantage of this enthusiasm by reason of the failure of Congress to provide funds.

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"THROUGH EUROPE."

October-December, 1922.

BY LIEUT. D. W. CLARKE, R.F.A.

Introduction.
Part I. By Air to Cologne, and the Occupied Territory of Germany.
Part II. Berlin, Vienna, and Budapest.
Part III. Belgrade, Sofia, and the Balkans.
Part IV. Constantinople, and the journey home.

INTRODUCTION.

IT is true, certainly, that the conditions of living vary almost daily in most of the countries of Europe at the present moment, but at the same time it is really surprising how many entirely divergent and quite fantastic reports one hears of life to-day in Berlin, Vienna, Constantinople, and the other great centres of the World. The result, as I know from my own experience, is that anyone who has not been abroad during the past two or three years has a totally confused idea of present day conditions in the ex-enemy countries and on the Continent in general.

These few notes of a recent journey between London and Constantinople have therefore been penned in the hope of giving to the prospective traveller some notion of what he may expect in Europe to-day, and of helping to disentagle the confused impression which exists in the minds of many people at home as to the conditions of life on the Continent at the present time.

But I must warn the reader not to rely too implicitly on the detail of these notes, for with the kaleidoscopic changes of Governments and falls of Kings which is the post-war heritage of Europe it is truly difficult to keep abreast of the times, and even as I write—a week after my return—some of my information may already be out of date. For this reason, therefore, I shall confine my remarks more to the general and less to the particular experiences of my tour.

BY AIR TO COLOGNE, AND THE OCCUPIED AREA OF GERMANY.

"LEVEL CROSSING—BEWARE OF THE AEROPLANES"! There is a low morning mist lying over Croydon Aerodrome, and even as the car jerks to a standstill a huge Handley-Page looms up and lumbers slowly over the road which separates the hangars from the actual flying ground at the London Terminal Aerodrome. One cannot help thinking that this greeting at the first stage of the journey

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is a very literal sign of the times to the modern traveller, who breakfasts in London, lunches in Brussels, and takes his tea in Cologne.

The car moves on, past the excellent restaurant and waiting room, and a moment later pulls up in the small group of huts which house the offices of the various flying companies, each with the flag of their Line waving over the roof.

Luggage is carefully weighed, passports are briefly examined, and, all formalities soon over, we cross on to the aerodrome itself.

Its a queer sort of place this Croydon Aerodrome, half dockyard and half railway station with its bustling porters and its cosmopolitan atmosphere. The pilots are standing around in groups, smoking cigarettes and glancing at maps—British, French, and Dutch, all well wrapt up in leather coats and with long sheepskin boots, ready to start for Paris, Brussels, Cologne or Amsterdam.

The "City of New York," labelled "for Brussels and Cologne," a big De Haviland painted dark blue and carrying the colours of the Instone Air Line, is "running up" her engine, while the aerodrome officials in their nautical-looking uniforms are stowing away luggage and conducting passengers. I had thought that the mist might have delayed our departure, but an Instone official assures me that it is merely local and that we shall start immediately.

There is a moment's delay while we watch a "taxi-plane" take off on his way to Nice and disappear over the murky horizon towards the sunshine of the Mediterranean, and then we go aboard and pack ourselves into the comfortable wicker armchairs in the limousine compartment of the machine.

The luggage has all been stowed away in the lockers fore and aft, the two pilots clamber up into their seats, and a minute later we are climbing over Croydon; a turn to the south and off we go, heading straight for the Channel.

We are carrying our full complement of eight passengers, sitting in pairs with a gangway down the centre of the machine so that everyone has a clear view from a window. But, although one can see for miles around, window gazing soon becomes tiring for the scenery does not change in rapid succession as in a railway carriage or a motor car, so after a few minutes I turn my attention to my fellow travellers.

I suppose we form a fairly representative crowd: in the front a small American with a large wife, then a young Englishwoman and a Colonel from the Rhine army, two rather nondescript youths, an elderly American and myself. The compartment being more or less sound-proof talking is quite possible, and I exchange a few remarks with my American neighbour. He is off on a globe-trotting tour and this is his first flight in an aeroplane, he has never been outside the States before and cannot speak one word of any foreign language; not that that worries him at all for the only information he asks for is "What do you say in Germany when you want a waiter"? I "put him wise," and he leans back in his chair perfectly contented.

The chairs are very comfortable in our "Limousine-Pullman" and the cabin is well heated; the one suggestion for an improvement that I would make is that the ventilation is none too good and the compartment is apt to become stuffy on a long journey.

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A notice on the wall that tells us that the machine is "inherently stable" and "will float in case of a descent on water", together with the warning that "an emergency exit will be found in the roof" reassures us as to our safety; in fact it is difficult to think of anything but safety in our comfortable and smooth-running machine. There are the usual adjuncts of the railway carriage, hat racks and coat pegs and even an apparatus "to communicate with the pilot in case of emergency," but with no £5 fine for improper use!

We have left Tunbridge Wells away to starboard and are now climbing as we approach the coast to gain height for our flight over the Channel. Folkestone is soon away to port and the rifle ranges of Hythe are directly below us as we finally leave England.

The Channel crossing is made in fine style and seventeen minutes later we find ourselves once again over land somewhere between Calais and Wimereux. St. Omer, Hazebrouck, and the battlefields are soon passed, with very little to distinguish them now as devastated areas, Lille and Armentieres are left away to the South and we turn due East for Brussels.

Most of the passengers have given up window gazing now; the Englishwoman is knitting, the Colonel deep in the "Morning Post," while the rest of the company seem to be slumbering soundly, all excepting my elderly American friend who is busy with notebook and pencil converting Marks into Dollars, via Pounds Sterling.

"500 Marks.....6 pence.....12 cents....."

He is still muttering to himself as we pass over Brussels and shut off our engine to descend on to the aerodrome. The large wife of the small American shows the first signs of alarm as we sideslip gently to lose height over the hangars, but the next moment the 'plane is safely bumping over the appallingly bad surface of the Belgian aerodrome.

The Belgian aerodrome is a very sorry contrast to the comfort and organisation of Croydon and lunch is taken standing up against the bar of a very indifferent canteen of the coffee-stall type.

Half an hour's halt, and we go aboard again and are soon off on our way to Cologne. The two nondescript youths have been shed at Brussels and belongings are spread out among the unoccupied seats. After an hour's uneventful flight in a dead straight line, Cologne is reached and we land on the very excellent R.A.F. aerodrome, where the familiar khaki everywhere reminds one that Cologne is almost an English town nowadays.

An Instone official guides us across for a very perfunctory custom examination, but where one must be careful to obtain a receipt for all money carried, for the Germans do not allow the export of anything above the equal of about £1 in value unless a receipt of import can first be produced.

A comfortable limousine car is waiting to take us into Cologne itself, and later deposits us outside the Dom Hotel, just by the great cathedral, about five hours after we left our hotel in London and ten hours ahead of those Earthbound mortals who pin their faith in trains and steamers!

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Cologne.

There are few signs to be seen in Cologne to-day of the "iron-heel" or the oppressive occupation of the conqueror which one might have expected to find, and the prevalent impression gained from a walk through this picturesque old town is one of complete content and happiness. True, troubles come to Cologne as to most other European cities in these hard times; riots, strikes, and disorders, due to the fantastically high cost of living and the abnormally low wages; but all of these are brought about by internal conditions in Germany and the presence of a British army on the Rhine in no way whatever contributes to this unrest but rather tends to minimise its effect.

There is very little unemployment in Germany at the present time although the wages received are only a fraction of what is required to keep up an appearance of anything but extreme poverty. The presence of the British soldiers and their wives helps to make Cologne considerably more prosperous than most German towns, and the astute inhabitants are not slow to recognise this.

Although fraternisation on a large scale has been very wisely avoided, Briton and German live together very peacefully; each with their own work, amusements and social life, they form two distinct sets living quietly alongside each other. A British military policeman stands with a German policeman directing the traffic at the cross-roads of the Hohestrasse, khaki-clad representatives of the R.T.O., mingle with the German ticket-collectors on the platforms of the Bahnhof, while each have their own clubs, theatres, cinemas, and even shops, for the majestic Navy, Army and Air Force Canteen supplies almost every want of the British community.

Still, the German is not the only one who lives happily in Cologne for there are few better spots in which the British soldier could wish to serve. Comfortable barracks and houses accommodate himself and his family, while the rate of exchange turns the week's pay into vast wealth when converted into Marks. The prices of everything when reckoned in English money are ridiculously low and it is all that the visitor can do to restrain himself from buying a pile of utterly useless articles solely for their cheapness. This is a dangerous habit to develop as nothing may be taken out of Germany without an export license, a difficult and expensive thing to obtain, and after hearing of the experiences of an American lady in the hotel whose purchases included a cinematograph projector, a telescope, and a theodolite, I determined to keep a firm hand over myself in this direction. Easier said than done; for no sooner had I acquired an excellent wrist-watch for the price of some eight shillings than the fever was on me. I escaped with a box of cigars and a panoramic map of the Rhine over five foot long, and considered myself lucky.

One could continue for ever with a tale of bargains at which those who haunt the basements of Oxford St. at sale time would turn green with envy. Half-a-crown will buy you a box of cigars, 3/6 a 1st class ticket to Berlin with sleeper, $1\frac{3}{4}$d. a seat in a box at a cinema, 9d. an excellent lunch with a glass of beer, 5d. the best seat in the

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theatre, ½d. a journey over the whole length of the tram route . . . . the list is endless, a veritable Paradise for the impoverished!

Cologne, an officer of the Garrison told me, is like an Indian Hill Station, with all its advantages and none of its disadvantages, and at a quarter of the price. Certainly the British population lead a very cheery life. There are thés dansants every afternoon and dances most evenings, with an excellent Jazz band and also an orchestra, in the magnificent ballroom of the Officers' Club, dinners, picnics, tea parties, and the usual social festivities, together with all that is offered by the Rhine Army Amusement Office.

This is a really wonderful institution and no description of Cologne can pass without mention of it. Nothing is too wide for the scope of their organisation which caters both for officers and soldiers, and for their families as well.

First of their attractions comes the Rhine Army Theatre, where an excellent series of plays of every variety are performed nightly in the old Deutsches Theater by an exclusively British company. I believe that Mr. Leslie Henson was one of the originators of this theatre and it is certainly a splendid organisation.

Then to cater for still more varied tastes we have the British Army Music Hall at the Scala. Although British in the sense that it is solely for the use of the British and Allied Armies, the programme, true to all Music Hall standards, is essentially cosmopolitan in character, and here French singers, Spanish dancers, and Italian acrobats combine with Scottish and Cockney comedians to provide you with a really enjoyable evening for the expenditure of a few pence.

Besides these established entertainments the Amusement Office have always a supply of the best seats in all parts of the house at the Cologne Opera, available at special prices to the Rhine Army. The Cologne Opera House must have been the means of introducing many a British soldier to his first opera; it is well up to the best German standards and its numerous patrons include all ranks of the British Army.

In summer time the Amusements Office arrange river jaunts down the Rhine, while all the year round sightseeing trips, conduced tours, dances, concerts, and whist-drives form its regular curriculum.

The object of the Amusements Office is to give the soldier something to do in his spare time, to prevent excessive fraternisation, and to keep him from less healthy diversions; it certainly fulfils its functions most admirably and is probably one of the most happy ideas and most popular institutions in the British Army.

Delighted with my impressions of the zone occupied by our Army, I was growing keen to compare it with that in the hands of the French; so that a very enjoyable stay in Cologne had to be cut short and a departure taken for Wiesbaden.

That wonderful journey down the Rhine has been described many times, and it is a constant source of beauty at all seasons of the year. The railway runs alongside the river the whole way through a district immortalised by a thousand legends, sleepy picturesque Rhineland villages, majestic haunted castles, Bonn with its University, Coblentz,

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until recently the Headquarters of the American Army, with its huge statue of Kaiser Wilhelm I, the famous Lorelei, the sinister Mouse Tower, Mainz, and finally Wiesbaden, a few miles inland.

Wiesbaden, and the French Zone of Occupation.

In Wiesbaden the essential difference between the occupied areas of the French Army and those of the British is very soon apparent. Although there is nothing very concrete to differentiate between the two, the regulation and control of the civil population being much the same in both places, nevertheless one feels it in the air immediately—it is a difference of atmospheres. Here is no good-natured tolerance of an army in occupation, but straight away one knows that this is the Victor in the Enemy's country. Very heavily marked is the line between Frenchman and German in Wiesbaden, there is a much greater display of the military, more marching of troops round the town with bands and colours, than in Cologne, and everywhere—black soldiers.

There is a great deal, a very great deal, to be said for the French point of view and it is very difficult for us, who have not the racial hatred of generations and who have never seen a German army on our soil, to realise it fully; but it is not good to an Englishman to see black men dominating white, under any conditions whatever, and the question which rises to one's mind throughout is "what will be the effect on these coloured troops when they return to their native land"? Certainly their discipline is admirable and they are kept under very strict control, but nevertheless to our minds the problem is there, and only time will solve it.

So much for our point of view, but on the Germans the effect is very definite; a bitter intense hatred of the French is the result, the bitter hatred of the man who has been knocked down and then jumped on by his opponent. There can be no permanent peace in Europe while racial hatred exists, and much will be needed to abate that between Teuton and Gaul. Germany has no wish to quarrel again with England, she harbours no ill-will towards America, but she hates France with the hatred of the vanquished.

But as to Wiesbaden itself. It was a pleasant town before the War, and it is a pleasant town now. Very little changed perhaps, except that whereas before it was essentially German, now it is essentially French. French is spoken very widely, there are frequently French plays at the theatres, French titles on the cinema screens, and the hotels contain many French civilians as well as soldiers.

In the hotels there are also a number of English and American visitors, and many refugees of the ancient Houses of Russia, whose small incomes when translated into marks enable them to live in comparative comfort and to while away the time at tennis, long walks in the picturesque Kurgarten, and the various pursuits which they have adopted in their exile.

The Russian refugee of good family is a prominent element in the life of any Continental city to-day, and the relatively low cost of living has brought a large number of them to Germany. Charming, good-natured, easy-going people with a tremendous uphill task in front

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of them, trying hard to adapt themselves to new circumstances, striving manfully to regain something of fortunes accumulated through centuries and all lost in one ruthless sweep. The Arts have claimed most of them: the theatres, ballets, and operas are full of them, while many are engaged in humbler occupations driving taxicabs and waiting in restaurants, with a very few who have just saved enough from the wreck to enable them to live quietly in the smaller German towns, where the rate of exchange still allows them to procure some of the comforts of life. The presence of the British and French Armies has naturally attracted many of them to Rhineland, and Wiesbaden seems to have been specially favoured.

The French soldier is probably not so well looked after in the way of amusements as his British colleague in Cologne, but all the same Wiesbaden is quite gay and there is always plenty to do. Long walks are a great attraction in the daytime, and in the summer the tennis courts are the most popular resort. Thés dansants are quite the rage among the French population and there are dances in the hotels every evening. Wiesbaden is a great place for music and, in addition to the theatres, there is always opera to listen to and excellent concerts in the Kurhaus.

A very pleasant time can be spent in Wiesbaden, and once again it was with great reluctance that I packed up my belongings and prepared to transport myself into unoccupied Germany.

So well provided for is the Englishman in Rhineland that the prospect of unfettered German control was none too pleasing, and as I passed the last sentry-box on the Wiesbaden-Frankfort road the grinning Moroccan leaning on his rifle seemed to say, "Well we've given you a pretty good time in our part of the country, but now you've got to look after yourself."

PART II.

BERLIN, VIENNA, AND BUDAPEST.

Berlin.

Much to my surprise, on arriving at the Anhalter Bahnhof at midnight after a long and tedious journey, I found Berlin fairly crowded out by visitors, and it was only after five vain attempts that I at last succeeded in securing a room in a hotel.

In fact outwardly Berlin seemed to be in full swing and living in an eternal round of hectic gaiety. In its night life it surpasses even Paris: dozens of cabarets are springing up in the neighbourhood of the Friedrichstrasse and the Kurfürsten Damm and draw their crowds of patrons every night; theatres, restaurants, music halls, and hotels are always full, and just now Berlin is living much the same life as London did in the last two years of the war.

But it is all an "eat, drink, and be merry, for to-morrow we die" sort of gaiety, for at the back of everyone's mind is a great dread of what the next month may bring. The poor are already badly hit and the high cost of food is making life very hard for them. The kiosks on the street corners are placarded with exhortations to the people to

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lay in supplies of potatoes, but the prohibitive cost of potatoes prevents many from taking this advice and with the ever changing value of the mark the farmer is none too keen on selling out all his stocks.

Nobody trusts the mark an inch, and the one idea of the population is to convert their German money into foreign currency or into solid goods before it drops still more in value. The result of this "flight from the mark" is an orgy of spending which leads one to arrive at a very wrong impression of the prosperity of Berlin. The dollar and the pound sterling go a very long way in Berlin, even though it is considerably more expensive than the other towns of Germany, and this encourages the numerous British and American visitors to spend their money freely.

The Almighty Dollar is certainly very almighty in Berlin now; it is the basis of all calculations, and the dollar talks loud in every transaction large and small. Houses and property are going dirt cheap at present, making "real estate" speculation a favourite occupation of the Americans who have invaded Berlin in large numbers.

I have said that the poor already are finding life very difficult, and a walk through some of the humbler parts of the city will very soon convince one of this; pathetic bargaining at the food shops, and the hungry shabby look of the people shows it only too clearly.

In the main streets the shops and pavements are still crowded, and the showrooms of the Unter den Linden still display wonderful cars of the most luxurious pattern and huge racers decorated with laurel wreaths and covered with the mud splashes of their last triumph; but the thousands of beggars at every turn serve to remind one of the more grim realities.

No eastern city could produce the number of beggars who haunt the streets of Berlin to-day, thin gaunt women and war-shattered men, blind, armless, legless, paralysed, in tattered remnants of the uniforms of the Kaiser's Army and the Imperial German Navy.

But even with all this poverty work is going ahead at full steam; some of the factories are working with day and night shifts, there is tremendous building activity everywhere, and road repairs on a big scale are being carried out all over Berlin, many of the main streets are up and the greater part of the Friedrichstrasse is impassable to traffic.

But the whole of Berlin is living on the edge of a volcano just now, and no one knows when it may go up: the Communists have been rioting already, people have been killed in the streets, and further outbreaks are bound to follow.

Still, in the meanwhile, the gay life of Berlin flourishes strong and there are plenty of attractions for the visitor. At the Metropol Theater an excellent and sumptuously produced revue "New York—Berlin" is drawing crowds every night, where the Germans are simply convulsed with laughter at the spectacle of an alleged American getting change for a dollar and needing an enormous suitcase to carry away his marks.

The Russian exiles, who have invaded the theatre and restaurant world, have found a home for the Russisches Romantisches Theater

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in the old Apollo Music Hall, where they have staged the most delightful Russian Ballet.

English authors are still very popular in the theatres, the daily list of plays including "The Taming of the Shrew," "The School for Scandal," Oscar Wilde's "Lady Windermere's Fan," and Bernard Shaw's "Pygmalion."

The proportion of foreign visitors in any town is well reflected in the size of the crowd at Cooks', and after a good half hour's wait in a queue I found that the prospect of securing a sleeper in the Vienna train was quite hopeless without giving at least a week's notice. I had to content myself with reserving a seat in a compartment—a very essential precaution I afterwards discovered—and spent an exceedingly uncomfortable eighteen hours in a very crowded train before eventually reaching Vienna.

I would here take the opportunity of giving one word of advice to any prospective traveller in this part of the world. Whenever it is possible to dispense with a trunk in the luggage van this should certainly be done, for hand luggage will be found to be worth its weight in gold; porters are scarce and customs examinations frequent and exhaustive, and the fact of carrying all one's kit in one compartment saves all sorts of difficulties. Turning out on to a cold platform for a two hours' customs examination in the early hours of the morning is bad enough in any case, but it is infinitely worse with heavy baggage; while pilfering and luggage stealing is rapidly becoming a national industry in many European countries.

The advantage of having all one's belongings constantly in sight will very soon be seen, and it should be remembered that the luggage racks are much more roomy than those on the English trains, a couple of large suitcases being quite easily stowed away in a Continental railway carriage.

Vienna.

If Berlin is still waiting for the crash to come, Vienna has had its crash and the population are left numbed by its terrific effect. The people of Berlin may look with dread towards the future, the people of Vienna care little for the future; nothing can be worse than what they have already been through and the city remains stricken and paralysed. Slight hopes are sometimes expressed at the prospects of a loan, but a cowed resignation to their Fate is now the chief attitude of the inhabitants of what was once the gayest city in Europe.

For one who had never seen Vienna in her pre-war days it is difficult to picture it as a centre of gaiety; in spite of the crowded streets Viennese life is now quite dead, and the depression of it all is overwhelming. The theatres are poor, the cabarets and music-halls half empty, the streets badly lit, and soon after dark most Austrians are already in bed—to save the cost of lights! This in a city once famed for the splendour of its Court and the gaiety of its restaurants and night life!

When one does see signs of prosperity, and strange to say the big hotels are usually crowded, one may be certain that it is a foreigner who is responsible for it. Most of them are Czechs, Hungarians,

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and neighbouring nationalities who have not fared so badly as the Austrians, with a good sprinkling of Italians. Of American and British visitors one sees very little signs, a point I was glad to note for undoubtedly foreign visitors do tend to make the price of food higher, thereby making life still more difficult for the inhabitants, with the result that their presence is very naturally resented.

I know that many people still think that because the krone is worth only some three hundred thousandth part of a pound sterling that living in Vienna must be ridiculously cheap for an Englishman. As a matter of fact it is quite the reverse; even at this fantastic rate of exchange the cost of living for an English visitor is very nearly as high as in London. Prices are usually reckoned only to the nearest thousand, and in most cases they no longer bother to add the word "thousand" when repeating the amount of a bill. "Sixty," the cab driver will growl at you after a very ordinary length drive, meaning of course 60,000 krone (nominally £2,400 but now equal to about 4/-).

There is a noticeable shortage of sugar and paper, and the globes have been removed from most of the electric lights in the hotels and other places, which tends to increase considerably the effect of depression.

I do not wish to paint a more gloomy picture than I can help and I shall not therefore dwell on the hundreds of scenes of hunger and poverty which meet the eye at every turn in Vienna, but misery and sorrow are written so plainly over the whole city that even the most casual observer cannot fail to be moved by the awful hopelessness of it all.

Austria has already touched the bottom, and there is some consolation in that whatever change may come must certainly be for the better; but at the present time her position is still pitiful in the extreme. All grades of society have been hit, but perhaps the worst cases are among the professional classes and more especially the retired State servants, who have to eke out life on pensions which to-day are practically worthless.

There is only one place in Vienna where something of its old glory is still reflected, and that is at the Opera. The wonderful Opera House is still there in all its splendour and magnificent operas are still to be heard there, and are still produced on the same lavish scale. If one shuts one's eyes to the sparse and rather shabby-looking audience it is quite possible to catch again for a moment some fleeting glimmer of the wonders of the Vienna of ten years ago. It is the one languishing spark of life which remains to-day. But how the Viennese can still manage to patronise their Opera is an obsolute marvel. The price of a back-row stall is 125,000 krone (8/- English money), and the other seats are in proportion; so that it can soon be imagined what an Austrian has to deny himself in order to pay one visit to the Opera.

Glad as I was to be able to leave all this misery behind me and to push on towards Budapest, it was some time before I was able to shed completely the spell of gloom which it had cast over me, and there is one picture of Vienna which I shall never forget. A tall distinguished-looking old man, gaunt and wasted with hunger, who

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I would see day after day walking the streets in the threadbare remains of a General's uniform with nothing left to him now but a faded cluster of medal ribbons.

Late at night I took a cab to the Danube landing-stage by the Reichsbrücke and went aboard a very comfortable river steamer, where I spent the night in an excellent state-room before sailing for Budapest at 7 a.m., the following morning.

The river steamer being run by a Hungarian company fares are paid in Hungarian krone, and it is interesting to note that the cost of the state-room and the fare for a twelve hour journey combined was just equal to the amount which I had paid to the cab driver for taking me from my hotel to the quay!

Budapest.

To go from Vienna to Budapest is to pass from darkness to sunshine, from gloom to gaiety, and the beautiful valley of the Danube is an appropriate route for the journey. It must be glorious in the summer when one can sit on the deck of a comfortable steamer and bask in the heat, but even in the winter it is a most pleasant means of avoiding a tedious railway journey.

For the greater part of the way the Danube forms the frontier line between Hungary and Czecho-Slovakia, so that one passes alternately from one country to another at each of the frequent stops when the steamer calls to pick up passengers from the small villages which dot the banks of the river. Each miniature landing-stage has its national flag flying aloft and its small group of soldiers, sailors,, and customs officials in wonderful uniforms, with a gathering of picturesque loafers who idly await the coming of the steamer as the sole amusement of the day. Many of these villages on the Czecho-Slovakian bank have changed their names with their nationality and some have even as many as three at the same time: such a one is Bratislava, which is known variously as Bratislava, Poszany, or Pressburg.

The journey occupies some thirteen hours, so that it was well after dark when we steamed into Budapest, arriving at about 8 o'clock. The blaze of lights on every side, from the water's edge to high up on the hills, presented a wonderful picture, and certainly Budapest looked very inviting.

Buda on one bank, Pest on the other, it sounds almost like a joke, but they are actually two separate towns and were administered quite separately until 1872, when they combined to form the Capital of Hungary.

The sparkling lights of Budapest twingling on both banks of the river proved to be a genuine reflection of gay life of the town and not a mere surface deception which at first I had feared. The bright cheery comic-opera life of Hungary still holds sway; Blue Danube, Blue Hungarian bands, picturesque gypsies, laughing women and gaily uniformed men are still the order of the day. War, Defeat, Bolshevism, and Revolution have all failed to change the outward appearance of the Hungarian Capital, and unlike its unhappy neighbour Budapest is still much as it has always been, a sort of miniature Paris.

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Everything is comic-opera here, comic-opera sailors, whose Navy has no sea on which to sail, comic-opera soldiers in marvellous uniforms of every hue but never two the same, and even a comic-opera Government, a Republic with a President who only serves to keep the throne warm for the next King to arrive. For Hungary remains staunchly monarchist at heart in spite of her Republic, and although the Hapsburg dynasty has certainly been cast aside for ever, the Royal Arms are still retained.

It was nearly eleven o'clock by the time I had landed, found my hotel, changed my clothes and prepared for dinner, but the night life of Budapest was only just beginning.

The dining room of the Grand Hotel Hungaria was crowded when I arrived but I managed to secure a table next to the balustrade at the raised end of the room, where with a dinner cooked by an artist and a bottle of sparkling Hungarian wine, one could sit for hours watching the ever-changing scene of colour and revelry.

The whole scene might have been lifted bodily from the last act of a musical comedy at Dalys'. The long room with its marble floor and pillars, palm trees in the centre, a Hungarian band in the corner playing the latest tunes from Paris, London, or New York, tall slender beauties with gorgeous dresses swathed round supple figures, in big black hats and long gloves, smoking cigarettes in thin amber holders, and their escorts with monocles and fierce black beards, in immaculate evening dress or rainbow-hued uniforms, with clanking swords, tinkling spurs, and fur-edged pelisses slung carelessly from the shoulder.

A wonderful place Budapest; gay at night and beautiful in the daytime, when the sun shines on white buildings stretching high up on the hills and the Danube flowing below with its busy steamers and puffing little launches.

A fine wide boulevard, the Andrassy Utcza, takes one right through the town itself out to the Public Park, well wooded and beautifully laid out, where military bands compete with gypsy orchestras to add to the general gaiety. The park is a great resort on Sundays with its theatres, tea gardens, bandstands, sulphur baths, and miniature zoo complete even to Mappin terraces.

Under the Andrassy Utcza and running in a straight line directly below the street itself is Budapest's comic-opera tube; a short flight of steps leads down to it, and the railway runs only a few feet below the surface of the road.

But not only does Budapest boast tramways and a tube, for down the Andrassy Utcza run also wondrous motor-buses somewhat similar to those of London but closed in on top as well as below!

Really it is a thoroughly delightful spot, and after the depression of Berlin and Vienna it has a most exhilarating effect.

PART III.

BELGRADE, SOFIA, AND THE BALKANS.

Belgrade.

Ten hours in a train will take you from Budapest to Belgrade, but for the difference between the two towns one might have travelled

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from Brussels to Baghdad. Budapest is essentially of the West, a thoroughly European city, while Belgrade is the East with all its crudeness and its squalor. Very similar in appearance too are its street scenes to those of the Mesopotamian capital, and with the exception of tramways and a few similar adjuncts of civilisation, Belgrade is in fact very little in advance of modern Baghdad. But what it may gain in civilisation it certainly loses in charm, for there is very little that is attractive in Belgrade; a crude, tumbledown, rather dirty, straggling town was the impression which I received of it.

One can generally obtain some of the comforts of life in the European quarter of most Eastern cities, but any signs of them in the Serbian capital are very difficult to find. Many of the streets are entirely unpaved, and even those which can boast cobblestones soon become a regular morass after a single night's rain. The hotels are simply pitiful: in what was certainly the best one in the town I occupied a bedroom entirely devoid of any carpet or rugs, with a bed which almost sunk on to the floor when I tried to get into it, and a collection of furniture of the most decrepid and ramshackle type that it has ever been my misfortune to set eyes on. Hot water was quite unheard of, and a bathroom beyond the wildest of dreams. The ragged apparition of a Serb boy, who acted as a general maid-of-all-work to the hotel, had his sleeping quarters on the small balcony outside my window; and there also he rose in the small hours of the morning to clean the boots, when the sound of mud being scraped off on to my window-sill would make all thoughts of sleep impossible.

There is perhaps a certain amount of excuse for the broken-down appearance of Belgrade, and before condemning it entirely one should remember that by being situated on the former Austro-Hungarian frontier it suffered very heavily during the war. It was frequently under the direct fire of the enemy guns, and the damage wrought on the buildings of the town was very severe indeed. However, extensive re-building operations are now in progress and we may hope that the new Belgrade will be a better piece of work than its predecessor.

A lengthier acquaintance with the town might possibly have induced me not to judge it so harshly, but a certain liveliness on the part of the local police definitely prevented this and my stay there was brought to a very rapid conclusion.

I warn the reader very strongly to ensure that his passport is absolutely correct in every detail before journeying to Yugo-Slavia if he wishes to avoid the experiences which fell to my lot.

In spite of the solemn assurances of the Consulate in London that my visa was quite correct, I was detained by the police immediately on alighting at Belgrade station on the grounds of my passport "not being in order," a suspicion which rapidly developed into a conviction of my Bolshevistic tendencies after a cross-examination and an inspection of my baggage The Serbs are terrified of Bolshevik propaganda and there is a great deal of official jumpiness over "suspicious passports," so that a very natural annoyance on my part was quite sufficient to brand me as a "Red" of the most rabid description.

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Perhaps my actions may have been a little "Bolshie"; for after being cooped up in a small room with a handful of criminals of various types for upwards of an hour while no effort whatever was made to enquire into my case, I sauntered into the police office and demanded that my passport should be returned to me. I was firmly told to wait, whereupon I sat myself down on the edge of a table, I was promptly told to stand up, I lit a cigarette and was immediately told not to smoke, and then as though they had failed to think of anything else to add to my discomfort they ordered me to take off my hat. I refused and the order was repeated, I said that I didn't understand and they repeated it in French, I still refused to understand and then a violent pantomime took place, as two or three policemen rapidly put their hats on and off in quick succession alternately gesticulating at me and shouting in a mixture of French, German, Serbian, and Russian. Seeing that they were now getting really angry I thought that I had better comply, so with a muttered "Ach, mein Hut"! and a smile of sudden enlightenment I swept off the offending article.

Then came a lull in the proceedings and I gathered from the fragments of conversation that a detective who could speak English had been sent for. Half an hour later the detective arrived and addressed me in American! I really cannot call it English for it consisted entirely of the most vivid vernacular of the Woolly West, picked up, as I afterwards learnt, from three years in a lumber camp in Western America. Any frequenter of the movies who has seen the "Sheriff" enter a "saloon" with a gun in each hand and a "posse" blocking the doorway behind him would have recognised the detective instantly as a minion of the Law. Standing well over six feet in height, with enormous shoulders and a three days' beard on his jowl, he wore a black sombrero, a short sheepskin coat, and loose breeches tucked into high laced boots; quite instinctively I looked for the tin star on his waistcoat which would have completed the illusion.

The Sheriff was very stern and severe but not entirely unfriendly, and after some persuasion I managed to secure permission to pass the night at a hotel, but only on the condition that I surrendered myself to the police before 6 a.m., the following morning. After the most piteous pleas on my part this was commuted to 7.15, but not a minute further would they go, and with a policeman sitting on the box I drove off in a cab to my hotel, where I received a far from cordial welcome.

At most times I am a poor hand at early rising, but when the boy outside my window dropped a pair of boots the following morning with an ear-splitting clatter, I jumped straight out of bed and groped quickly for my clothes. I understood then the feelings of the condemned prisoner on the morning of his execution as I stood shivering on the cold floor, and horror suddenly froze my limbs as I caught sight of my watch—it was 7.45 already and half an hour ago my ticket of leave had expired! What happened in these wild parts to people who were late at their appointments with the police I hardly dared to contemplate, and even now I fancied I could hear the tramp of the firing squad on the stairs outside. Dishevelled and breathless

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I dashed headlong into the police station just an hour overdue, to find the Sheriff eyeing me with distinct disapproval. The three days' beard had now increased to a four days' one, and it comforted me to think that he too had made a hasty toilet.

There followed a long interval while I was conducted from place to place and while the Sheriff made out long and labouriously written reports which were duly stamped—with stamps provided at my expense—and passed on to higher officials. Those who rail at the red tape of British officialdom should just take a glance at that of Yugo-Slavia! Still if the wheels of Justice moved slowly they moved surely all right, and at about 10.30 I was taken in front of the "Commissar," a rat-faced little man who examined me in French and to whom I took a violent dislike. In reply to his questions I demanded to be taken to the British Legation, and after a short consultation with the Sheriff I was given permission to go there. A few minutes with a very sympathetic official was sufficient to settle the case and I was able to return unmolested. However, I was not allowed to remain in the country, and I was given forty-eight hours in which to get over the frontier: In the words of the Sheriff I'd "gotta beat it," and beat it I did, on the first train to Sofia.

On my return to the railway station I found that I had a few hours to spare before my train left and I spent them in wandering round the town, not a wildly interesting occupation. Ragged peasants, blind beggars, and bullock carts all added to the Eastern appearance of Belgrade, but what impressed me most were the soldiers. Soldiers on the march, soldiers driving cars and wagons, soldiers lounging in the streets, the place was full of them, and every eligible male semed to be in uniform.

At about 7 p.m., I made for the station and boarded the Sofia train, where I had the distinction of being the sole occupant of the 1st class compartments. The Sheriff came to see me off, and my passport was restored to me a few minutes before we started.

I saw the Sheriff heave a deep sigh of relief as the train carried me out of the station, and I must say that I harboured no regrets at my hasty expulsion from Yugo-Slavia.

Sofia.

My first thoughts on driving into the town of Sofia from the railway station were that I had just arrived as a revolution was breaking out in Bulgaria. It was quite clear that something unusual was afoot; the shops were all closed and flags were hanging from every window, while the few people who were to be seen in the streets were all hurrying along towards the main square in the centre of the town. The cab was rapidly whirling me along at a brisk trot in the same direction, and as we grew nearer I could hear the beating of drums and the sound of military bands vaguely discernable above the roar of singing crowds.

I began to wonder what a crowd of revolutionaries would think when a bourgeois foreigner with a pair of bulky suitcases drove plutocratically in a cab into the midst of their gathering; the more I thought about it the more unpleasant it seemed and the more remote

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seemed my chances of escaping with a whole skin. A sudden glimpse of the square itself as we rounded a corner did not tend to allay my fears. Both the square itself and the roads leading into it were packed to suffocation with surging crowds. They were swarming everywhere, on lorries and on wagons, on the lamp-posts and the roofs of the houses, students, soldiers, men and women of every sort. Orators were shouting from their perches at the corners, bands were playing loudly, drums beating and flags flying, while the massed population were engaged in bawling out at the top of their voices a song with a very martial air.

Already the cab had reached the outskirts of the crowd and I was quite certain that my last hour had now come, when a policeman, armed with a rifle and fixed bayonet in addition to a revolver and a whole armoury of knives, jumped forward and seized the ponies' heads, bringing the cab to a sudden stop and shooting me violently on to the floor. Apparently he told the driver to avoid the main square and to drive round it, for we turned off into a side street and proceeded by a very devious route to the ramshackle hotel which was to be my residence in Sofia.

Thankful to have reached a haven of safety at last I hastily paid the cabman and entered the hotel, determined not to venture out again until long after dark. But much to my surprise I discovered the proprietor quite unmoved amid all these thrills. In answer to my anxious questions I received the most casual reply that it was "only one of these Saint's Days," and all my fears had been caused by a mere public holiday.

Later on I actually mixed with the crowd and watched the procession file past. Seen at close quarters it really looked a very harmless gathering, but all the same I felt devoutly thankful that they were engaged on a peaceful occupation. The procession seemed to be endless, and each little group was headed by its military band and accompanied by an escort of villainous-looking police all armed to the teeth.

The procession drifted on in different parts of the town until the early afternoon, when it proceeded to split up, and the marchers occupied themselves by strolling through the streets or listening to the numerous orators who had started off at the street corners in true Hyde Park style. There was a good deal of letting off steam and a good deal of shouting, but by nightfall most of the crowd had dispersed and peace reigned once again.

Next day normal business was resumed and I had more opportunity of exploring the city. Much to my chargin I discovered that in the Union Palace Sofia possesses a hotel of quite good European style, and I began to regret very much that I had taken up my quarters in the very low-brow hostelry to which the cabman had driven me on my arrival. But my hotel—lodging house would be the better word—could supply no food to its visitors and I was able to take full advantage of the Union Palace so far as meals were concerned, which was at least some consolation.

Sofia, while still remaining essentially Balkan in character, is a very pleasing contrast to Belgrade. The town is very picturesquely

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situated on a plateau surrounded by purple hills and is laid out in an attractive style. There are good streets, wide open squares, neat public gardens, and several quite handsome buildings; chief among these are the Royal Palace, the residence of King Boris III., the opera house, the public baths, an institution which is surprisingly well patronised, the State bank, and several others. The most remarkable feature of Sofia is certainly the huge Greek Church in the centre of the town which towers above everything else.

The late King Ferdinand seems to have adopted Sofia as his particular hobby, and it is he whom the Bulgars have to thank for the artistic design of the capital. Whatever may have been the politics of the notorious "Foxy Ferdy," his experiments in town-planning seem to have met with remarkable success.

His son, Boris III., now occupies the throne of Bulgaria, but he is not I believe a very powerful factor in the government of the country. With the close proximity of Soviet Russia it has been difficult for Bulgaria to avoid some of the poison germs of the Bolshevik propagandists, but the very fact of its proximity has served to dispel any illusions as to the benefits of the Bolshevik rule.

In accordance with the modern fashion of the Near East there are several unsuccessful ministers in the prisons of Sofia awaiting trial, I believe on the charge of being implicated in bringing about the defeat of Bulgaria during the War. Politics are rather a precarious occupation in this part of the world, although it must be admitted that the system has its advantages.

Altogether I found Bulgaria very pleasant, and an Englishman will meet with marked courtesy throughout the country; whether this good-feeling extends below the surface is perhaps questionable, but it certainly enhances the pleasure of one's travels.

At Sofia I picked up the Simplon-Orient express and booked straight through to Constantinople; the super-luxurious train striking a strange contrast to the rugged scenery through which we steamed on our way to the frontier

PART IV.

CONSTANTINOPLE, AND THE JOURNEY HOME.

By the time the train had reached Svelingrade, the last station on the Bulgarian side of the frontier, we had already passed crowd after crowd of the Greek refugees who had fled from eastern Thrace at the entry of the Turkish Gendarmerie. Svelingrade station was full of them, apparently the rearguard of the main exodus, who had just managed to put the frontier between themselves and the Turks and who were now taking the first long rest that they had been able to snatch since their forced march over the hundreds of miles of intervening country. They were a sorry looking spectacle on the whole, dirty and ragged, consisting chiefly of old men women and children, who were now sleeping on the platforms huddled together under blankets, with their odd piles of belongings on the ground beside them and their mules and donkeys tethered to decrepid old wagons parked on the outskirts of the station.

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Forty minutes later we were in Adrianople where we saw the first sign of the recently arrived Turks; and from Adrianople onwards, right into Constantinople, our progess was marked by one continuous display of Nationalist flags, produced under strict orders for the welcome of Rafet Pasha's Gendarmerie. The Star and Crescent was stuck on every conceivable object, on the carts and the wagons, on the bridles of the horses and in the buttonholes of the crowds, and every train, building, and railway station was literally covered with them.

The train was soon passing through the former battlefields of the last Balkan war, where signs of the old Turkish defences are still to be seen, on through the famous Chatalja Lines, and then along the sea-shore into the outskirts of Constantinople itself, where one already began to catch sight of the camps of the British, French, and Italian Armies of Occupation.

At 10.30 a.m., we drew up in the main station of Constantinople, whence a Ford car driven at breakneck speed through the narrow streets of Stamboul bore me off to my destination.

The native town of Stamboul is separated from the European quarted of Pera by the famous Golden Horn, and one passes from the one side to the other over the bridge of boats at Galata. Galata Bridge is always one of the busiest spots of Constantinople and there one can stand for hours watching the throng as they hurry to and fro amid a kaleidoscopic medley of multi-coloured garments. The babble of a hundred different tongues fills the air and the crowd represents every variety of the human race; white, black, yellow, and coffee-coloured, they jostle each other elbow to elbow on the swaying bridge, slow ponderous Turks in baggy trousers and bobbing tarbouch, young up-to-date Turks in European suits with gold topped canes, Turkish soldiers in their ugly uniforms and wierd caps, French poilus in their blue steel helmets, British Guardsmen immaculately turned out, with bright shining buttons, Italians in flowing capes and feathered hats, sailors from the ships, British, French, American, Spanish, Italian, and Japanese, Italian policemen in tail coats and red striped trousers with cocked hats of Napoleonic appearance, derelict soldiers from the Wrangel army, swaggering Cossacks in wonderful breeches and boots, a row of cartridges gleaming across their chests and astrachan caps set jauntily on their heads, it is a spectacle unequalled anywhere else in the world.

Soldiers and sailors of every nationality pack the tramcars, mounted police in khaki patrol the streets, staff officers dash to and fro in cars, and below the bridge the water is full of small craft of every variety.

The scene at sea is almost as cosmopolitan as that on land; out in the harbour and in the mouth of the Bosphorus the water is black with shipping, graceful white-painted passenger ships from the Black Sea, troopers, refugee transports, cargo boats of every kind, and warships large and small from England, the United States, France, Italy and Spain. Up in the Golden Horn on the other side of the bridge you will see a herd of dishevelled and dirty looking battle-

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craft, it is all that remains of the Turkish Navy now safely cooped up under Allied scrutiny, rusty and uncared for.

Walk through the city, in Pera or Stamboul, and everywhere you will sense a feeling of the acutest tension and everywhere you will find the same electricity in the atmosphere. For the fate of Constantinople is now in the balance. Inside the town are the armies of the Allies ready for whatever may happen, outside in the hills of Anatolia and far along the Asiatic coast of the Sea of Marmora are the armies of Mustapha Kemal, each one waits for the first move of the other, and who can tell what may befall Constantinople when that move comes.

The Greeks have gone already, and all the remaining foreigners have made their preparations for immediate flight, their womenfolk have been sent to places of safety, their belongings are all packed ready for evacuation, and the decks of Constantinople are cleared for action. The wildest rumours spread through the town every moment, and in the streets, hotels, or coffee houses small groups gather together and discuss in low tones the latest situation or the newest "crisis" which has just arisen. Spies are everywhere, and Constantinople is living well up to its reputation as the centre of the intrigue of Europe; your neighbour in the hotel where you sip your evening cocktail will warn you to be careful what you say when such and such a waiter is near you, and who knows but that your innocent looking taxi-driver is not in direct touch with the Powers at Moscow.

In the evening a howling mob of Turks will sweep down the Rue de Pera bawling patriotic songs and firing fusilades in the air from their revolvers, and up with a rush will go the shutters in Tokatlion's Hotel until the crowd have passed. They are very terrifying at close sight these processions, but the shots are mostly fired harmlessly into the air and many of them are only blank: occasionally a soldier is shot or stabbed in the streets, but on the whole the crowds are kept well in hand.

Next morning one will see the other side of the question when, with bands playing and colours flying, battalion after battalion of British troops will march through the town, while overhead flights of aeroplanes drone over the housetops.

You will not have to walk far in the streets before you come to an excited crowd pressing round a doorway; if it is not a crowd outside a breadshop, for the Turks are very short of bread since terror drove the Greek bakers from Constantinople, you may be certain that the Kemalist police are making an arrest, and soon some unfortunate supporter of the Sultan will be dragged through the streets in chains with a heavily armed guard around him. During the first weeks of last November these rounds-up were going on wholesale, and so-called traitors to the cause of Mustapha Kemal were being shot by the dozen. One of the first to be seized was the unfortunate journalist Ali Kemal, a very clever and highly cultured Turk who was well known in the European and Diplomatic circles of Constantinople. The story of his arrest and subsequent murder is a dramatic and horrible one.

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One Sunday night four Turks called at the Cercle d'Orient and asked for Ali Kemal. They were told that he was expected in a few minutes. "Would the gentlemen wait"? "Yes, they would wait for him." Ten minutes later Ali Kemal entered the Club and was told that some visitors were waiting to see him. The next moment he was looking down the barrels of four revolvers, and the unfortunate journalist knew that he was a prisoner of the Kemalists. Some say that he little dreamt that he was going to his death, for he bore his arrest with wonderful calmness; he was escorted outside to a waiting motor-car and rushed down to the shore of the Bosphorus where a motor-launch was ready to receive him, and he was swiftly transported to Ismid on the Asiatic side.

Perfectly composed and cooly smoking a cigarette he walked from the quayside through the crowds who were awaiting his arrival. A little later he was being taken from the Governor's office to the prison to await his removal to Angora when the maddened crowd wrested him from his useless escort of one officer and a soldier and tore him to pieces in the street.

It was a horrible story and being the first outrage on a well-known citizen of the town it shocked Constantinople to the core. There is no doubt that his fate might have been that of many faithful adherents of the Sultan if they had not taken warning from Ali Kemal's awful death to smuggle themselves out of Turkey and escape to a safer shore.

But in spite of all these wars and rumours of wars there is plenty of amusement still to be found in Constantinople. It is chiefly the Russians who carry on the restaurants, theatres and cabarets of the town, and after the experiences of one hurried flight from their own country they refuse to be moved by all these terrifying happenings, and placidly continue to minister to the entertainment of the Allied troops. There is plenty of dancing to be had, cinemas and music-halls still flourish, there is an excellent Russian Ballet to be seen twice nightly, and the cosy little cabarets of the Grande Rue de Pera are always well filled.

It is a very admirable fashion among the British troops to patronise these Russian refugees as much as possible; to help a down-and-out Russian General the Tommies will buy the strange walking-sticks which he is selling at the street corner, and an officer choosing a taxi-cab off the rank will always select a driver who is not wearing a tarbouch, for he is certain to be a Russian, while most of the waiters at the clubs and the messes are refugee soldiers from the Tsar's army. The Russians themselves reply by abstaining from the local tendency to exploit the soldier, and for a couple of shillings they will give you an excellent dinner at their restaurants, while their taxis will cost you considerably less than the ricketty Fords of the local gentry.

So hopeless is the position of these unfortunate Russians that they care little now what becomes of them, and it is horrible to think what would be their fate if the Allies were to evacuate the town.

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I left Constantinople in the evening just as the sun was setting over Galata Bridge and the Golden Horn with the domes and minarets of Stamboul silhouetted on the sky-line, and steamed out through the lines of warships into the Sea of Marmora.

Next morning we passed through the Dardanelles, still dotted with the masts and funnels of ships sunk during the historic landing of 1915, and left behind all the alarms and rumours of the Near East as we entered the Mediterranean.

Malta was our first stop, and anything more peaceful after the excitements of Constantinople would be difficult to find. Malta still carries on its old existence with priests and goats still its principal features, but it has recently become a sort of island of refuge for the exiles from the turbulent lands farther East, and here the refugees of Constantinople, Smyrna, and Greece have at last found a haven of rest.

From Malta a ferryboat carries one across the sixty miles of sea to Syracuse, whence a train follows the beautiful coastline of Sicily as far as Messina, and then across on the train-ferry into Italy itself. The towns on each side were just beginning to light up for the night as the train-ferry carried us across to Reggio, and the Straits of Messina presented a picture of wonderful beauty. Beautiful too was the scenery through which the train passed the next day along the West coast of Italy, past the Bay of Naples, and along to Rome. Now that the Fascisti have disbanded and Signor Mussolini holds sway at the head of the Government, excitement seems to have died down in Italy and there is little unusual to be seen in the streets.

Back in the train again and along to Milan, past Lake Como, through the St. Gothard Tunnel into Switzerland, over the Alps, with a huge electric locomotive now drawing the train, Lucerne, Basle, and once again we are in Germany. Of all the wonderful railway journeys to be found in Europe I doubt if there can be any to equal that between Milan and Basle; round the edges of placid lakes, through deep rocky gorges with their summits quite out of sight, and over the huge snow-capped Alps, it is a route of magnificent beauty.

Once more we follow the Rhine through Mayence, Coblentz, and Cologne, and then into Holland, past Rotterdam, and at last we reach the Hook where the train draws up alongside the G.E.R. Company's steamer.

By 7 o'clock the next morning we are in the train at Harwich, breakfast occupies the next hour or so, and 9.30 a.m., finds us once more back in London.

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THE HUMAN ELEMENT IN PEACE TIME TRAINING.

By CAPTAIN O. G. BODY, D.S.O., R.F.A.

SINCE the end of the Great War, military thought has been almost entirely engaged in considering the problems with which modern mechanical device and recent invention has confronted it. The supreme argument in war, however, is the morale of the troops. Yet to-day the mechanical side of our army is growing at the expense of the human and romantic and little has been written or deduced from the fund of material that should be forthcoming, concerning the psychology of warfare—our most important study.

In an army recruited from an industrial nation, technical skill will soon be acquired. Those very same social and economic conditions which have given the recruit this talent have, however, taught him to think for himself, and have made him less prone to obedience, and rely less and less upon the fellowship of those about him. In short, civil life to-day does nothing to foster those human and moral attributes which are essential to success in battle. With the development of the mind of the "Man in the Street" from whom our armies are drawn, the moral factor is tending to enter more and more into the argument of war, and it becomes more than ever necessary to concentrate on this side of a soldier's training.

At the conclusion of the European War in 1815 Napier summed up the characteristics of the British soldier in a famous passage of literature. In giving first place among the infantry of the world to the British, it is not to superior skill or training that he alludes, but to human moral qualities which gave success in battle. "That the British Infantry soldier is more robust than the soldier of any other nation, can scarcely be denied by those who in 1815 observed his powerful frame, distinguished amidst the armies of Europe. Notwithstanding his habitual excess in drinking, he sustains fatigue and wet, and the extremes of cold and heat with incredible vigour. When completely disciplined, and three years are required for this, his port is lofty and his movements free. The whole world cannot produce a nobler specimen of military bearing; nor is the mind unworthy of the outward man. He does not indeed possess that presumptuous vivacity which would lead him to dictate to his commanders, or even to censure real errors, although he may perceive them. But he is observant and quick to comprehend his orders, full of resource under difficulties, calm and resolute in danger, and more than usually obedient and careful of his officers in moments of imminent peril. It has been asserted that his undeniable firmness in battle is the result of a phlegmatic constitution, uninspired by moral feeling. Never was a more

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stupid calumny uttered. . . . . Did he not endure with surpassing fortitude the sorest of ills, sustain the most terrible assaults in battle unmoved, overthrow with incredible energy every opponent, and at all times prove that while no physical military qualification was wanting, the fount of honour was fresh and full within him."

This passage might well have been written at the conclusion of the war in 1918. Prior to the Great War the Britisher was slow to realize his worth. To-day, however, the contact of thousands of British thinking men with foreign armies has left the same outstanding impression on our minds. A great self-satisfaction and confidence in comparing ourselves with others. The war left us certain of our own sterling worth as a nation, and with a sense of our great moral superiority. Surely this is the bedrock on which we should build in the battalion, the battery, and the squadron.

One of the most interesting contributions to the subject under review was the report of the shell shock commission of 1922. This has done much to direct military thought in the right direction, and to set men seriously to think of the great forces that act and re-act on the human mind in battle.

The whole battle spirit of our army was reviewed by them. Their enquiry ranged from the causes and prevalence of malingering and desertion, right up to the genuine cases of nervous disorder caused by shell explosion. Their conclusion was that moral diseases were prevalent in the inverse ratio to the time that the troops had been under training and military discipline. That in our highly trained expeditionary force of 1914, disorder of mind was practically non-existant.

The Commission was almost entirely composed of eminent civilian doctors—and presided over by Sir Frederick Mott, the leading brain specialist of the day. They refute entirely the idea so largely prevalent among civilians, that the man as picked raw from the street, is fit to take his place on the battlefield after a little technical training as to the use of arms. They fully endorse the pre-war methods of maintaining that standard of discipline which will stand the test of war. of mental training is necessary in order that a man shall undergo the strain of war with a minimum of hardship.

As a result of this Commission we have a new word introduced into our Military vocabulary—Manmastership. A word badly needed. Under this heading will fall all that pertains to the moral welfare of the troops, the fostering of the fighting spirit, and of establishing and maintaining that standard of discipline which will stand the test of war.

In order to build our discipline on a sure foundation we must examine the primary motives which cause men to set their teeth and fight. Here we have to draw a very distinct line between a national army, and a professional voluntary army.

In a national army the spirit of patriotism is uppermost. The effect of a land frontier alone is magical, and the spirit is stimulated even when at peace. Their recruits join them with their fighting motive already developed.

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A British peace time army, however, can never be primarily animated by such motives. Our appeal must be to esprit de corps, a strong appeal to discipline and duty for the regiment's sake and honour. Our recruits join with none of this spirit developed.

National armies have never been prompted to fight from motives of esprit de corps, except a few of the corps d'elite. Their own welfare, their own protection, and the maintenance of all that is dear to them in their national life is their motive. That strong appeal to discipline and duty for the regiment's sake and honour means little and is unnecessary. In our war time army this spirit was eventually uppermost. A great many regular soldiers in handling New-Army troops failed to recognize this distinction.

Curiously enough troops which enter battle fully trained to a sense of esprit de corps have always more than held their own with those solely imbued with motives of patriotism. It may be that the former is a higher motive, a more unselfish ideal, than the latter which after all is merely that of self-preservation.[1]

Napier tells us that "of all the various springs and levers on which moral force depends, Military Honour is the most powerful."

Patriotic fervour can be more readily roused and more easily damped. It lacks the constant quality which belongs to military honour and esprit de corps. Wellington had something of this idea in his mind when he declared that "enthusiasm in an army can only produce confusion and other ill-effects."

Patriotism can do little to stimulate a professional army. The regiment must be all in all to them. Discipline springing from a sense of duty and military honour, and not resting on King's Regulations or the Army Act must animate it, and the spirit of mental apathy when it tends to prevail must be combated at all costs.

To-day we are in that transitory state where our wartime motive of patriotism no longer exists, and our old peacetime motive has not fully recovered its force.

The first of our great commanders to realize the full force and value of a keen regimental spirit was Sir John Moore. He laid the foundation of our army traditions and founded our code of military honour. In Sir John Moore's Diary in which there is so much to learn concerning the human element, there occurs the following extract of a letter written to his Chief, Sir Ralph Abercrombie.

Written from St. Lucia, 1796.

"Great attention must be paid to the cleanliness and even to the neatness of the soldier's person, to the regularity of the soldier's diet, in addition to the eating part of his ration instead of the rum, sea or river bathing, constant activity and movement; in short, General, with a Roman instead of a modern exercise and discipline, troops in the West Indies can I am sure be kept healthy. A parade twice a

[1] In 1914 we had the instance of two opposing armies impelled to fight from entirely different motives. The German army highly patriotic, the British firm and reliant in military honour and sense of duty. The Germans failed to realize this great psychological fact. Hence their surprise at the vigour with which the British returned to the attack at the Marne and the Aisne.

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day, consisting of a mere inspection and exercise of arms, is easy for the officers. It leaves them with what they call more time; but it leaves the soldier also to lounge the whole day long in barracks, where the air cannot be good and where from indolence the body becomes enervated and liable to disorder. The army that you left in this country has almost entirely melted away. The officers and men are dis-spirited, the former thinking of getting home and framing excuses, in many cases the most shameful, to bring it about. I fear the same fate will attend whatever troops are sent out, unless great attention is paid to get the proper officers at the head of the regiments who will re-establish discipline and inspire those under them with some of that zeal and ardour, which I am not too young to have seen, but which you must so much better recollect to existed in the service in your day."

A few years later in the great training camp at Shorncliffe, Moore was able to put these principles of training into practice. It produced an entirely new Military "school" and was to give to the British Army some of its most illustrious names. In the Oxford Light Infantry Chronicle the principles of discipline which Moore introduced are set down.

"First it was necessary to have the officers efficient before the men, and to require of the officers real knowledge, good temper, and a kind treatment of the men. Second that powers should be delegated to the officers commanding companies, and that the men should be taught to look to them alike in matters of discipline, drill, food, clothing, awards and most punishments. Third that all officers and N.C.O's. were to understand that it was their business to prevent rather than to punish crime. The whole system was one of developing, and not of repressing intelligence, of making the development of the man contribute to the effective unity of the whole, of enlisting the zeal of the private as much as that of the officers in perfecting the whole."

Behind that great success however, was the man himself. Again quoting from Sir William Napier's "Life of Sir Charles Napier"—

"From the three Infantry regiments, obscure until Moore took them in hand, went forth a crowd of men, skilled to gain authority and public notice, without political or family interest. Certainly it was a great school. Officers were formed for command and the soldiers acquired such discipline as to become an example to the army and proud of their professions. . . . . Though drill was an important part of their instruction, it was not by that alone that the soldiers were formed. It was the internal and the Moral system. The constant superintendence of the officers, and the real government of the Captains, which carried the discipline to such perfection."

The duty of inculcating the correct spirit of discipline and the training of almost all that pertains to the mental and moral welfare of the soldier is in the hands of the regimental officer. It is very necessary that they should feel the full force of their responsibility

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and should themselves practice and understand what they demand of others.

A definition of discipline is to be found in the first chapter of our training manuals. In the training of troops this must be constantly before our minds. Our text books tell us that *Discipline is the ingrained habit of cheerful and unhesitating obedience, that controls the fighting spirit.* It is something very far removed from mere obedience. It is the *habit of obedience,* and that obedience must be *cheerful obedience.* Here we come to a great distinction to which all regimental commanders must be alive—the distinction between cheerful and reluctant obedience. All officers are in the habit of being obeyed, but in what spirit?

The foundation of successful training is mutual confidence between all ranks.

In the army to-day there has been introduced the spirit of Master and Man. Its appearance is undoubtedly due to the influx of civilian thought into the army during the war. The soldier tends to look upon his officer in much the same way as he looked upon his employer in civil life, and upon his N.C.O. in the same way as he looked upon his works foreman. This spirit must be changed at all costs. A spirit of comradeship must unite all ranks—comradeship intermixed with strict military discipline and etiquette. Our soldiers must be treated openly and frankly as men, and a confidence in their officers must be inculcated.

Discipline must rest upon the bottom rung, and it must be such that every man feels that it is to his advantage to subject himself to it, and that privilege will accrue. His discipline must be cheerful and unhesitating and not reluctant. A commanding officer must not depend on his officers and N.C.O's. solely for its maintenance, but should feel that he has the full support of barrack-room opinion behind him. In units where this standard of discipline has not been attained, it is quite obvious that existing barrack-room opinion must not be allowed to prevail and that unit commanders must take steps to combat it and lead barrack-room thought in the right direction.

To enjoy the confidence of the troops that confidence must be sought, and the troops must be told over and over again what is required of them. If troops can only be persuaded that their officers are out to create a happy and healthy regimental atmosphere they will respond to any amount of mental and moral propaganda.

The following is another paragraph from our text books which must be clearly impressed upon them—

The growth of moral qualities is fostered chiefly by Environment. It is the duty of all ranks to assist in this object by their conversation and their example.

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Notice "It is the duty of all ranks." How seldom is this put before the troops in language they can understand. The man must be constantly reminded of his duty to his comrade, and must be persuaded to enter into the true spirit of regimental life, of which comradeship is the basis.

Real live regimental officers are required to bring home to the troops the true spirit of discipline, and to make the code of military honour permeate as far as the barrack-room. How often, however, do we find that the only instruction that the young soldier receives concerning his moral welfare is across the Orderly Room table from an irate C.O.

Those officers who have had the privilege of regimental soldiering both in the pre-war and post-war armies cannot fail to realize that to-day something is lacking. The old confidence and loyalty that used to knit all ranks has largely disappeared, and is returning but slowly, and in place of the regimental spirit, the spirit of reluctant obedience is evident. Much can be done to remedy this by appointing those officers to command who have themselves those human and moral qualities, and have the personality to inspire them in others. Troops show evidence of apathy largely as the result of soulless administration.

Given professional knowledge, personality, a fund of human sympathy and a sense of humour, any officer can exercise the art of command. The remaining essentials to exercise it in its highest form may be acquired by study and experience.

With our reduced services every avenue must be explored that is likely to lead to increased efficiency. To ascertain and lay down the principles which govern the successful exercise of command—to foster the art in the young officer and the N.C.O. and to make sure that the higher commands are only held by those who are exponents of the art—this seems to be an avenue leading to a very profitable field.

The example of the officers is of paramount importance. Officers must bear in mind how everything they say is repeated in the barrack-room. How their actions both off and on parade are discussed and enlarged upon. They should realize how very careful they must be that their actions and their speech cannot be misunderstood or misinterpreted. They must remember that the opinion of the barrack-room is largely that which those soldiers who are in personal contact with them convey.

That being so an officer's conduct off parade is a measure by which he will often be judged. Officers who conduct themselves quietly and with dignity, will invariably go down better with the troops than those who are noisy, flippant, and familiar. Anything of a morose nature however will always be hateful to the troops, as it is to brother officers, and a sense of humour is essential to a good regimental officer.

A sense of class honour also fosters the great moral strength which resides in an army and which is a great cause of its effectiveness. Officers would lose the respect of their subordinates if they did not show

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a more ticklish sense of humour and a finer breeding. The statement of the democrat that a man of the lower classes will more readily obey his equal than a gentleman is entirely false.

The quality however that our text books tell us is most essential to cultivate is energy. *Energy in training, energy in fighting pride in work, and sympathy for his men, are the Commander's sure ingredients of success.*

In reading Military History we are often surprised at the diversity of character of the world's successful commanders. One would think that they would all be true to one type, but this is far from being so. The same results can be obtained through varying channels. The same quality which commands respect in one, may detract from the character of another; it is out of place among those other traits which go to make up the curious sum total of a man's personality.

A comparison of the character of Lord Hill (Farmer Hill) with that of Picton or Crauford, gives us very much to wonder. The former is reputed never to have spoken a word in anger to any man. Himself obedient to a fault. The most successful and trusted of Wellington's Lieutenants. Crauford and Picton on the other hand, fiery of temper, coarse of speech, both even prone to disobedience, which they so severely penalised in others. The troops followed both types alike with equal devotion. We may well ask how it is that such diversity of temperament succeeds under similar conditions. We find however that there is one quality that runs constant throughout—Energy—and if there is another it is personal bravery. The latter quality, however, can only be shown on the battlefield, and helps little in peace time training.

Any effort on the part of the officers to curry favour with the troops by leniency always results in loss of prestige, and is always resented by the troops themselves. The man in the barrack-room hates to be patronised. He likes to be able to fully avail himself of all the benefits which our system of administration is intended to give h'm, and he looks to his officers and his N.C.O's. to assist him. Nothing more does he ask or desire of them. Those in authority who carry out this duty faithfully can demand any standard of discipline they like. Having given their best they can ask for the best in return. Give all and exact all, is a sure guide to success in the handling of troops.

Compulsion must be the ultimate resort upon which discipline relies. With some types of human material it is the only resort.

At the conclusion of the war a book was published which shocked and horrified the civilian mind. "A Private in the Guards," by Steven Graham. It made many cry aloud against the system whereby men subjected to army discipline become merely human cattle, half hypnotised by habit. We must remember though in reading this book of what the human material consisted. The Conscript. Compulsion was the only method by which to obtain results. The author himself is forced to admit reluctantly that the ends justified the means.

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Even in the face of slaughter, this material "remembered they were guards."

In the later stages of the war there was also another type of discipline. The discipline of the young soldiers battalions. The discipline of "bon volonté." These two types of discipline were not merely arrived at hap-hazard. They did not spring up by chance. There were plenty of Guards officers and N.C.O's. in these battalions. They were the deliberate outcome of psychological study. The means by which it was calculated that the best results could be obtained.

That standard of discipline which gives the best results in our peace time army is the happy mean between the two types. The spirit of cheerful and unhesitating obedience can be kept alive by "bon volonté." The spirit of reluctant obedience has its antidote in compulsion.

One must always remember as an officer that it is one's business to make and not to break the soldier, and that we must expect little from the man unmade. To admonish and put a man upon his honour is often a more effective remedy to crime than twenty-eight days' detention. If this means has failed, pursue the methods of compulsion to the hilt. One must remember at all times that there are effective substitutes for fear, punishments, and for Military Law.

In handling the recruit it must not be forgotten that perhaps eighty per cent. of those who join have never previously come into contact with the class from which their officers are drawn. They naturally shrink from that contact and are ill at ease when in their officer's presence. They must receive constant instruction as to the standard of conduct which those in authority over them expect. They must be told quietly in the lecture room and not "barked at" on the square. They will then feel confidence in the presence of their officers and N.C.O's.

The outward marks of respect paid by the soldier to the officer cannot be too rigidly insisted upon. In this respect it must be borne in mind that the soldier is a very shy individual, and that the occasions when he turns his back or avoids the presence of an officer are, for the most part, merely the result of this shyness and diffidence, and not, as a rule, the result of deliberate intention to avoid the payment of a compliment.

The salute is the outward sign of correct esprit and the spirit of cheerful obedience. By the regularity and the manner in which it is given the whole tone of a unit can be read. A slovenly salute is the sure sign of an ill-disciplined unit. In some cases it may be noticed as merely a reluctant touch of the cap. The regulation salute must be insisted upon. The forearm must be horizontal, and in passing an officer the hand must remain at the salute for the regulation six paces and men must break into quick time and not slouch past.

Those officers who have been with troops in wartime must have noticed a great falling off in the salutes when things are going badly in the line. The same troops after a success are saluting at every turn. In London during the war the same thing was to be observed.

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With so many men in uniform the regular salute of all officers by the soldiers was hard to observe. On those days, however, when the newspaper boys were shouting our military successes the soldier seemed to glory in saluting every officer that he met as if he wished to claim comradeship with all in authority over him.

The soldier who is well turned out will invariably salute. If he is on fatigue or dirty there is a falling off in the number of salutes he gives. He does not wish to call attention to his presence. We all know the old soldier, bemedalled and well turned out, and his "look at me" salute. He has the discipline of the regiment in his making. He makes all the young officers feel that they have something to live up to, and of which to be proud. The troops must be told that it is their business and in their interest to put this feeling into the hearts of their officers.

They, as well as the officers, must be taught to glory in the glitter and the sparkle of parade, and in the snap and finish of their drill. That offences against sobriety, regularity, and orderliness, are offences against their comrades. They must be taught to delight in sport with an orderly crowd on the touch line, and feel that an unhappy unit is the result of slackness and corruption. They must cultivate, as some old writer puts it "an air and spirit above the vulgar." The Officers, N.C.O's., and the old soldiers must create this magic influence.

This influence must come from the top. Each officer must contribute something. Those that do not contribute are not worth their position or their pay. It is often said that an inspecting general can get a better idea of the discipline and tone of the regiment by having a meal in the officers' mess than by reviewing the unit on parade. There, it is true, one can see the whole influence to which the troops are subjected. Some messes collectively presenting an air of manliness and dignity and responsibility; in others an atmosphere savouring of the light novel and the cinema. Officers too will cultivate an air of indolence or foppishness. It may only be affected, but what of its effect on others. Apart from that too, we tend to grow into exactly what we pretend to be

It is for officers openly to set out to provide an influence which neither the working man's home, nor the board school can provide. Something to put new spirit into the young recruit. Something to give him a notion of what a great country expects of those who wear its uniform and represent it among foreigners and enemies. It must be an object lesson to the community among which it moves in order, cleanliness, politeness, punctuality and good breeding. Civility not servility is the goal at which we must aim.

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THE GERMAN ARTILLERY

in the "Breakthrough" Battles in the World War.

By Lieut. P. G. E. WARBURTON, M.C., R.F.A.

Colonel Georg Bruchmüller has brought out a second edition of his book "Die deutsche Artillerie in den Durchbruchschlachten des Weltkrieges." As in the first edition, he does not attempt to offer a history of the German artillery in the Great War, but confines himself to recounting the developments in the methods employed by the German artillery in the battles in which he himself took part, preceding this, however, with a short account of the pre-war development of the German artillery. He illustrates his remarks by references to the various engagements in point, but a detailed description of these battles is left to a separate volume.

No one is better qualified than Colonel Bruchmüller to write on the offensive methods employed by the German artillery in the latter part of the war, for the methods were his or those of his staff.

Before his retirement in the autumn of 1913, Colonel Bruchmüller had been an instructor at the School for Foot Artillery for two years and had on several occasions been attached to the Field Artillery School. On the outbreak of war he was appointed commander of a Landwehr battalion of Foot Artillery and Staff Officer of Foot Artillery in the Fortress of Ulm. In 1915 he went to the Galician front as commander of the 86th Field Artillery Regiment and artillery commander of the 86th Division. The artillery dispositions made by him in this capacity, at the battle of Narotchsee in the spring of 1916, attracted general attention and thenceforward he was employed to advise on the artillery preparations for all big battles on the Eastern front, notably at the battle of Riga, until, late in 1917, Hindenburg and Ludendorff ordered him to follow them to the Western front. On this front he acted as artillery adviser in the German counter-attack at Cambrai (30th November, 1917); the Somme Offensive (21st March-1st April, 1918); the Battle of the Lys (9th-18th April); Chemin des Dames (27th May-2nd June); Noyon (9th June); the Marne and Champagne (15th-17th July). It is not to be wondered at that this officer was given the nickname of "Durchbruchmüller" (Break-through-Müller).

The difficulty of pushing reforms against old prejudices was not diminished by the fact that, as Lieutenant-Colonel and later as a Colonel, Bruchmüller had to instruct artillery and other General Officers of varying degree in the use of his arm. Nor was the fact that he was a "dug-out" officer of the Foot Artillery without its effect on the attitude of some senior officers.

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It is probably on account of these experiences that the volume under discusion is, to English taste, much overladen with personal testimonials from various Generals and other ranks. A great profusion of butter is also distributed; even if all ranks, both social and military, come in for their share, this adulation cannot but be tiresome to anyone reading the book from a professional point of view and lacking personal interest in individuals concerned.

The author appears to have found some difficulty in combining a clear account of the tactical, executive, and administrative, offensive measures evolved by the German General Staff, with a survey of the difficulties encountered in securing their adoption and the manner in which these difficulties were surmounted. In spite, however, of the presence of much matter, which is somewhat irrelevant to the study of artillery tactics, and of the fact that the book makes few additions to the tactics taught in English artillery schools in 1918, it contains much interesting and instructive reading.

Owing to his professional history, Colonel Bruchmüller is particularly interested in the relations between the two branches of the German artillery and the achievement of a mobile character by the Foot Artillery. At the beginning of the war, the Field Artillery were still inclined to regard the Foot Artillery as creatures who were accustomed to "fight behind rampart and ditch." Position warfare, however, gave the Foot Artillery an opportunity to prove the value of their more thorough technical training; while the grouping of Foot and Field Artillery under common artillery commanders (from either branch) from the artillery of a division upwards, greatly assisted the development of a feeling of comradeship.

Only the personal intervention of the ex-Kaiser (about 1900) enabled the Foot Artillery to secure mobile equipments and inclusion in field manœuvres. The remainder of the army regarded the heavy artillery units as a great impediment to mobility.

Colonel Schirmer contributes a short review of the German artillery armament during the war. He is an expert on this subject and is now employed in the Inspectorate of Arms and Equipment. He claims that the types of guns used by the German army during the war made a more efficient whole than the artillery armament of any other combatant. Referring to the rival claims of mobility and fire-effect, Colonel Schirmer suggests the construction of a light gun, which will be able to follow the infantry anywhere. This would permit of the weight (and hence the effect) of the ordinary field-gun being increased.

Colonel Bruchmüller remarks that Allied publications have shown what an enormous factor the German heavy artillery was in the holding of the extensive front.

Captain Justrow, a well-known German authority on ammunition, also now employed in the Inspectorate for Arms and Equipment, reviews the artillery ammunition used by the German army during the war

In peace time both design and adequate production of artillery ammunition was somewhat neglected. The results were soon felt in

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the war. The universal (Shrapnel and H.E.) shell was of little use. The German heavy artillery shells had a great effect, but their field artillery ammunition proved inferior to that of their opponents. The Allied field artillery shells were "very unpleasant" to the German troops; "even their shrapnel achieved some results in exceptional cases, but did not in general gain any very great regard."

Captain Justrow refers to the great efforts made to cope with the enormous demands for ammunition from the German fronts in East and West and from their allies. Cast-iron shells were the chief stand-by for a time, but caused many prematures. The difficulties of mass production caused great variation in the ballistic and other qualities of shells, fuzes, and propellants, but the results achieved in all fields of manufacture were very remarkable. The different types of shell and fuzes evolved were innumerable.

It is difficult to say what forms ammunition and weapons in general will take in the future, but Germany's enemies appear to be devoting their chief attention to gas warfare; after that come tanks, artillery on caterpillar tractors, and bombing planes controlled by wireless. Ammunition might be expected to develop accordingly.

Captain Justrow concludes with a warning to his German readers. The present state of science, as applied to lethal weapons, and the results achieved during the war give no ground for anticipating any revolutionary discoveries in the near future, such as the rays, referred to in Major Solf's book "Germany's Resurrection, 1934," which, emitted from a small box, detonate explosives at great distances. No one should deceive himself as to the complete helplessness of Germany in the matter of munitions, the lack of which cannot be remedied without much time and labour.

Colonel Bruchmüller gives an interesting little sketch of the development of Krupp's works at Essen. The first steel castings were made in 1816. During the war 1914-1918, these works, with the Gruson works, produced :—

10,843	complete guns from 3·7 to 42cm. calibre.
9,439	pieces from 3·7 to 42 cm. calibre.
4,755	gun-carriages and travelling carriages.
22,500,000	finished shells.
25,000,000	tubes for shell.
22,000,000	time-fuzes.
13,000,000	percussion fuzes.
23,500,000	gaines.

In addition there was an enormous production of spare parts, machinery, infantry shields, etc.

Artillery Procedure in the Attack.

Secrecy is essential for the success of an attack. Experience showed that those officers who were initiated into the plans were less indiscreet than those in ignorance. The necessity for secrecy was thoroughly impressed on the troops and every care taken to conceal the

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increase in troops in the sector of an intended attack, even field kitchens were made to go to camps already known to the enemy to do their cooking. Daylight traffic was not permitted to exceed the normal and traffic at night was carefully controlled, so that dawn should not surprise a block on the roads. The noise of transport was muffled in the forward area. Frequent references in orders to the probability of an enemy attack were intended to deceive the troops as to the object of the preparations being made. The successful measures taken by the French 4th Army to withdraw from the attack made by the German Crown Prince's Group on the 15th July, 1918, are a good example of the consequences of a failure to maintain secrecy.

The writer points out that the German army lacked the necessary means for an attack by massed tanks and aeroplanes, which should, given good troops, be made without artillery preparation or after a short burst of fire.

In nearly all battles of the great war, the terrain added to the difficulties in the way of bringing the artillery forward after the capture of the first enemy position.

A trench system cannot be broken through unless surprise is combined with speed.

Towards the end of the war, artillery orders for an operation were issued, not in one bulky volume, but in a succession of short orders, which allowed each to carry its proper weight and facilitated their timely execution.

The interdependence of the artillery work in big operations necessitated a very thorough centralization of command. Only matters of detail were left to subordinate commanders. At the same time, these were encouraged to suggest improvements and even to make minor alterations on their own responsibility. Further reasons for this centralization of command were the lack of time and local knowledge on the part of many artillery commanders brought up for the attack, and the necessity of ensuring that the best methods were employed whatever might be the personal opinion of subordinates.

An important feature of Colonel Bruchmüller's scheme was the thorough explanation to the infantry of the intentions, powers, and limitations of the artillery. Before every attack artillery commanders lectured to the staffs and to the infantry officers of each regiment in turn. The infantry officers were instructed to explain the artillery scheme to their subordinates, but, in the interests of secrecy, not before reaching the battle positions.

Lectures were also given to artillery commanders and questions, suggestions, and difficulties, were then discussed with them.

In allotting artillery tasks, that of destroying the wire and "making the enemy front line ripe for attack" was allotted as far as possible to trench mortars, to free the longer ranged artillery for other work. The trench-mortars were usually under the artillery commanders and their orders were closely co-ordinated with those of the other artillery.

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Towards the end of the war, at least one battery was detailed to neutralize each known hostile battery and some were kept in hand to deal with any enemy batteries which might open fire from new positions; the latter were otherwise employed until needed for counter-battery work.

The calculation of the number of batteries required to deal adequately with the remainder of the enemy's position necessitated the closest study of the whole of the forward and back areas. A slight safety margin was allowed for dealing with enemy reinforcements. In view of the large number available, field guns firing gas were the normal counter-battery weapon, their high rate of fire enabled them to attain almost as great effect as howitzers. The natures of guns for other tasks were allotted after careful study of the requirements of each case and according to the artillery available.

Sufficient ammunition was always demanded to allow all guns to fire at their maximum possible rate during the whole period forseen for the artillery action.

The organization of the artillery for the attack was, briefly, as follows :—

Counter-infantry batteries. 1 group per front-line attacking division, under the commander of the Division.

The Group was divided into sub-groups, one for each regiment in the front line (usually three), and these were again divided between the two zones, the first and second enemy positions.

Counter-battery artillery. One group per General Commando (Corps) in the attacking line, under that H.Q., and further groups on the flank of the attack. Sub-groups for each divisional front.

*Long-range artillery....*One group under each General Commando in the attacking line. Sometimes divided into two sub-groups. Employed on flanking fire, the engagement of distant targets, camps, communications, balloons, headquarters, villages.

Very heavy flat trajectory guns. One group under each army H.Q. employed in bombarding very distant targets.

Infantry batteries. A few batteries of the divisional artillery (infantry or mountain guns, if available) were always detailed to accompany the infantry. These did not take part in the barrage, but awaited the advance, limbered up under cover.

For an attack, a Corps (General Commando) took over what had been a divisional front. Thereupon the artillery commander of the division till then in position became the Corps artillery adviser and commander of the Corps counter-battery artillery, in which capacity his local knowledge was of great use. Before this change took place, suitable officers of the division in position were detailed to do the preliminary work for the counter-infantry, counter-battery, and long-range groups and sub-groups. On the arrival of the Corps, these officers were then attached to the staffs of the respective group and sub-group commanders. The preliminary work included the recon-

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naissance of battery and wagon-line positions, ammunition depots (one per corps and one advanced and one rearward depot per front-line division), and necessary extensions of the light railway system. Telephone communications were laid to sector sub-group H.Q's. Trigonometrical work was done and battery boards were prepared.

The references to the work of the survey, sound-ranging, flash-spotting, and meteorological sections call for no special comment. The artillery deployment necessitated good and sufficient roads. Divisions in line were responsible for keeping the roads in their sector in good repair. Moves were made by road as far as possible to relieve the congestion on the railways.

For the final deployment, batteries were divided into three classes; those whose positions were fully covered and which could therefore occupy these as soon as they arrived; those which could conceal their guns near their battle positions until the night of the attack; and those, which, on account of the exposed nature of their positions, could not take them up until the night of the attack.

Ammunition was brought forward as early as possible and carefully concealed in shell-holes, ruins, bushes, etc.

To ensure continual artillery support during the whole advance through the hostile positions, it was necessary to place some batteries very far forward, even in the front line. This sometimes led to massing of guns to take advantage of cover.

Command-posts were established so as to utilize existing communications as far as possible.

The necessity for concealment and lack of time usually combined to forbid any digging in of batteries. For the majority of the gun detachments, cover was only provided against weather and aerial observation.

In the later battles, the artillery action was divided into three main phases. First, a general bombardment was suddenly opened on infantry, artillery, and trench-mortar positions, command-posts, signal-centres, billets, and H.Q's. All natures of ordnance and also gas were used. This was immediately succeeded by the second phase, consisting of intensive counter-battery work, in which many of the counter-infantry batteries co-operated, while back areas and the communications of the sector to be attacked were kept under continual fire. The third phase followed, and consisted of systematic bombardment of the infantry and artillery positions, and of the back areas, by the batteries allotted to their various tasks.

During the bombardment, the barrages were frequently shifted and measures taken to deceive the enemy as to the actual opening of the assault.

The duration of the bombardment varied from $7\frac{1}{4}$ hours to 2 hours 40 minutes, tending to decrease with a view to allowing the enemy less time to take counter measures and, by concentration of fire, to reduce the outlay of ammunition for the paralyzation of the defence. Complete destruction of the defensive system was no longer sought.

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The bombardment was so arranged that the assault should be delivered at break of day.

Every effort was made to vary the procedure as much as possible.

During the assault, the counter-battery fire and barrage on communications were maintained, while the infantry were covered by a rolling barrage and by the batteries detailed to advance with them.

If a further advance was to be made, only so many batteries were pushed forward as could be adequately supplied with ammunition. This frequently reduced later artillery support to little more than the divisional artillery.

A detailed description is given of the procedure evolved by Captain Pulkowski at the end of 1917 for the opening of fire without previous registration. It does not differ from that already taught in the British Army during 1917,but appears to have been more generally relied on in the big German attacks of 1918 than in British attacks. The essence of it was careful calibration of all guns, good survey work, and accurate meteorological allowances, also careful sorting of ammunition and suitable corrections for variations in ballistic qualities.

Colonel Bruchmüller remarks that the neutralization of hostile batteries necessitated a continuous bombardment. Destruction of these batteries could rarely be attained and never certified.

The creeping barrage was sometimes a double one. A H.E. barrage moved just ahead of the attacking infantry preceded by a gas barrage at a sufficient distance to dissipate before the arrival of the infantry.

A fixed time programme for the barrage was found to be the most practical arrangement. On the Western front the creeping barrage advanced at the rate of 1 Km. in 30 (later 40-50) minutes by bounds of 200-400 metres.

Great stress was laid on close liaison between the counter-infantry batteries and their own infantry. Each battery had one or more observers in the front line, and another (sometimes one for several batteries) accompanied the advancing infantry. The first category were connected by telephone, etc., with their batteries, the latter were provided with signalling detachments to keep them in touch with their front-line observation posts. Further, an artillery liaison officer was attached to each attacking battalion and had his own signal detachment.

Much attention was paid to practising the batteries in all the duties which fell to them in the attack. Barrage tables of an approved type were issued blank to batteries to fill in.

Colonel Bruchmüller concludes this interesting volume with eulogies of some of his subordinates and some lyrical prose and poetic quotations of a patriotic nature.

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A REAL MINIATURE RANGE.

By Captain R. V. M. GARRY, M.C., R.A.

THE miniature range described in this article will it is hoped prove both instructive and interesting to those who have been in the habit of using a "sand range" with its usual attributes of cotton wool puffs on wires and other efforts of the imagination, which, though they have the advantage of being capable of construction anywhere and in a short time, tend to become uninteresting with prolonged use.

It is not claimed that the ideas are original in any sense, but they may not have occurred to some people, and the whole apparatus is so simple as to be within the powers of an ordinary "mistri"; the material required is obtainable anywhere, even in a place like Mosul where the amenities of civilization are few: Our battery fitter Havildar Manawar Khan, who is an exceptionally good workman, made the whole apparatus in a day.

At a time when our attention was focussed on Lausanne and the typed wireless news was carefully scrutinized daily, when legible, we thought an improvement on the "sand range" was necessary. to practice all British and Indian officers at ranging, and sustain their interest by making it more like the real thing, especially as at times the latter looked like becoming a fact.

The apparatus required is a ·22 inch miniature rifle which is clamped on the gunmetal arm of the oscillating bracket of the range gear of the 3·7 inch howitzer, with which the battery was armed.

The arm is so constructed that by the aid of a leather wedge the rifle can be clamped to the piece at an angle of about 30° depression and can then be elevated or traversed by means of the gun gear wheels.

The laying for line is done by means of the dial sight which is only about 6 inches out of the rifle line, and the gun block system is used.

A piece of wood about 10 feet long of 3″ × 3″ timber is planed on one side and a degree scale marked on it; a degree of 3·15 inches in length is suggested. This will give about 18 to 20 degrees right and left of the zero point, which is in the centre. The scale is placed 15 feet from the dial sight. It should be graduated in 10 minutes divisions.

Four blocks of wood, cubes of $1\frac{1}{2}$ inch sides, marked 1, 2, 3 and 4, are then used to represent the guns of the battery. All corrections for line for the guns are obtained by moving the block or blocks concerned along the degree scale the distance ordered and laying on each in turn through the dial sight, of which the dial remains unaltered.

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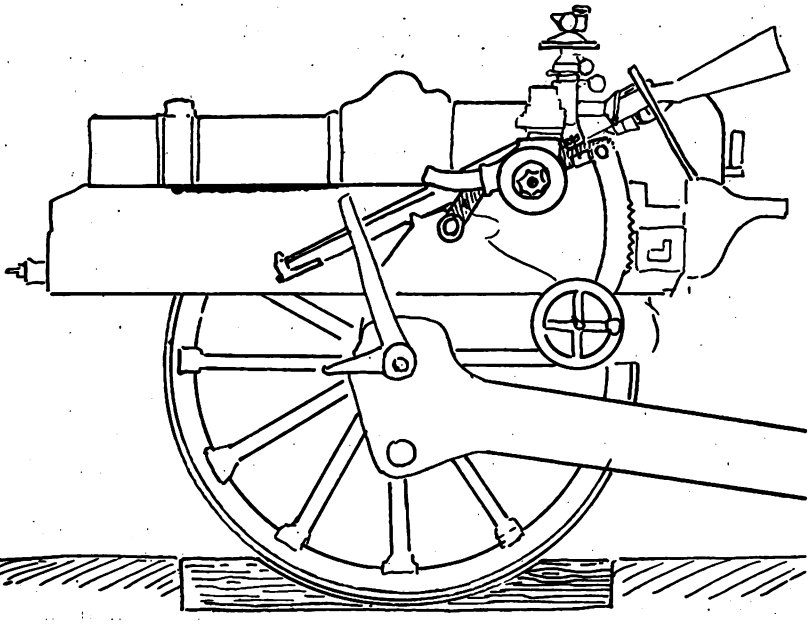
DIAGRAM SHEWING RIFLE FIXED ON GUN-METAL ARM (SHADED) OF BRACKET OSCILLATING



The range scale can be made of a strip of sheet zinc as shewn with a screw and nut; it is slipped over the end of the range drum and clamped there. It is better to apply a thin coat of black enamel to it beforehand, and then the graduations can be "scribed" on it when in position on the drum.

The range described was made in the side of an old quarry within 20 yards of the gun park. The gun was run up to the edge of the cliff and two pieces of wood were let in to the ground level, and slightly hollowed out to take the wheels.

The range, which was about 15 feet below, was then made on a scale of 1 foot to 100 yards, the whole occupying a space of about 60 feet by 40 feet wide.

A gallery about 15 feet long was cut in the bank about 12 feet below and 10 feet in front of the gun for the O.P., and was to scale 1000 yards in front of the battery. A bench in the gallery allowed of observation in the battery line or, to the same scale, up to 1000 yards to a flank, while the height of the observer's eye represented about 500 feet above the average level of the range.

To graduate the range-strip, the range was pegged out by tape measure along a centre line. Pegs were placed at 20, 25, 30, 35, 40, 41, 42, etc., to 50 feet, i.e., 2000 yards to 5000 yards. The tops of the pegs were levelled by aligning them, and laying along their tops with a No. 4 director.

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The rifle was then laid on each peg-head over its sights and the bubble of the sight clinometer brought level (this had previously been set at zero). The appropriate graduation was then "scribed" on the strip. The shorter ranges were only "scribed" at 500 yard intervals and the intermediate 100, 50, and 25 yards put in by dividers; but the ranges between 4000 and 5000 yards were marked every 100 yards because of the small size of the scale; 25 yards could be marked even on the small scale.

It is obvious that the scale would be opposite to that of the range gear; i.e., 100 yards at 2000 yards would on the miniature range scale be about three times as big as 100 yards at 4000 yards.

For a zero point a small stick was left embedded about the centre of the range; it was easily visible both from the O.P. and the battery. This point was then taken as being of zero angle of sight and its range as 3500 yards. All ranges, switches and angles of sight were calculated from this point.

The range was then constructed to scale, heights not being exaggerated; and the battery's ingenuity was employed in designing batteries, villages, houses and bridges, etc. The actual range constructed was modelled after a certain nala near Mosul much used for practice camp shoots.

The strike of the bullet is easily visible, even on wet ground, and the craters can be examined after the shoot in the usual manner. It is satisfactory, if possibly unrealistic, to blow an entire wood or village sky-high; the writer has never done so in practice, but then he has not served with 18 inch howitzers.

The range can be adapted for practising communication of orders by telephone between the gallery and the gun, which in an Indian battery, at any rate, can never be practised enough; and can also be employed for an aeroplane shoot.

The B.C. would in this case be seated in the gallery at the end of telephone, with his apparatus aerial ranging grasped firmly in his left hand, while making lightening calculations with his right.

He would be provided with ground strips of wood about 1 foot long and 1 inch wide. The observer above him on the gun level but to a flank would call him up by the telephone buzzer, and send observation in clock code by it, working with the battery by the ground strips' signals from below. A North point for the miniature range would of course be arbitrarily fixed beforehand.

In conclusion, the writer hopes these ideas will prove useful and interesting to those who are armed with the 3·7″ Howitzer and to others who no doubt could adapt the principles to their arm. He apologises if he has inadvertently copied someone else's patent, but he has been out of touch with artillery schools at home since 1919.

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OBSERVED AND UNOBSERVED ARTILLERY FIRE.

Part I.

BY LIEUT.-GENERAL H. ROHNE (retd.), GERMAN ARMY.

Translated by Lieut. W. L. Gibson, R.G.A.

The article in No. 21/1922[1] of the *Militär-Wochenblatt* on " Observed and Unobserved Artillery Fire " gives considerable cause for reflection, and therefore is deserving of consideration, even if one does not agree with the fundamental idea, namely—that unobserved fire which only a short time ago was regarded as the exception even for stationary warfare, is now looked on as the rule for future moving warfare. Everything that the author says about fire with ground observation is correct; there will be differences of opinion about the conclusions drawn from his statements. A plain denial of everything will be of no use, and consequently I will give material reasons for my objections to his arguments.

The author demands unobserved fire only for the main body of the artillery, which is under the C.R.A of the division, the actual " battle artillery "; for the artillery working in close liaison with the infantry observed fire is to be the rule. He considers it impossible for the main body of the artillery to employ ground observation, owing to the lack of time for choosing the numerous O.P.'s required, and the even greater difficulty of controlling fire from a flank forward O.P., which may have to be occupied failing one in the line of fire.

It is admitted that it demands time and is difficult to find suitable O.P.'s, but nevertheless it should be attempted, even when only a few fortunately placed positions may benefit thereby. Incidentally it may be remarked that the O.P. should always be chosen before the battery position, and not vice versa. A general advance of all the artillery as close as possible to the front line is objected to by the author owing to the difficulty of the ammunition supply. Undoubtedly the supply becomes more difficult the nearer one comes to the enemy, because lines of communication are longer; but, against this, the ammunition used from such positions has much more effect than that employed without observation from positions more to the rear. In this latter case much more ammunition must be employed; it is consequently questionable whether the additional quantity required could be transported with the battery. The ammunition supply could be ensured up to the battery position by armoured lorries or even caterpillars instead of horse transport. I agree with the author that in moving warfare no great success will be obtained from aerial observation.

[1] Translated in "R.A. Journal," Feb., 1923, p. 540.

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The author seems to expect great results in moving warfare from map-shooting, with allowances for weather conditions, etc., as was done in stationary warfare. First of all, however, for shooting by map a large-scale map is necessary—at least 1 : 25000—as otherwise neither one's own position nor the zone to be covered can be sufficiently accurately marked; in moving warfare the provision of such maps is naturally out of the question. The calculation of the error of the day requires the setting up of meteorological stations to supply the necessary data, which demands just as much time as the choosing of suitable O.P's. To prepare for unobserved fire as the normal method is to lose all possibility of a quick decisive action, and it facilitates the commencement of stationary warfare. One's opponent is thus given the initiative.

Details of the proposals:—The calculation of the quantity of iron and chemicals required should not, in my opinion, be left to the G.O.C. He has his hands full with his strategic and tactical tasks, and it would be better for him merely to give the C.R.A. the exact area to be attacked; the calculation of the amount of ammunition required would then be left to the latter. I think, however, that even the C.R.A. would not be in a position to work this out.[1] In stationary warfare one had fixed figures as to the number of shell—by calibre—which was necessary to prepare for an attack or to cut off any area by a barrage. These figures were also always over-estimated to allow for eventualities; but this was only possible as there was ample time to collect the necessary ammunition. Only when the ammunition had actually arrived was the order to shoot given.

The creeping barrage failed often enough in stationary warfare where the conditions for its success were comparatively favourable. In moving warfare one lacks the exact knowledge of the ground to be covered which is imperatively necessary if the attacking infantry are to follow the barrage closely. Finally, it is impossible to synchronise all watches exactly, as is necessary for a creeping barrage.

Concerning the choice of ammunition for unobserved fire, the question as to whether gas shell can be employed in moving warfare has not been decided. I consider it doubtful whether troops should be allowed to advance against an area that one has attempted to poison by the use of such shell. I do not know the German instructions which existed for the employment of gas-shell (by the Treaty of Versailles they may not now be produced in Germany); the French manual of artillery states that a 75 mm. gas-shell makes an area of 5 sq. metres impassable; a 155 mm. gas-shell an area ten times as large. To poison effectively an area of 200 metres by 500 metres (100 hectares) either 200,000 75 mm. or 20,000 155 mm. shell would be required. If the ammunition supply for one gun in the battery and column be taken as 300 rounds, to carry out this task 6-700 light field howitzers or 60-70 heavy field howitzers would be required, and in moving warfare it would hardly be possible to collect so many on such a front.

[1] The new French artillery instructions give details as to the number of rounds required to search an area of I ha. (about 2—5 acres).

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In addition to gas-shell one has H.E. and shrapnel. In stationary warfare shrapnel lost its good reputation, and in fact many German artillery experts demand its abolition. I consider such a step as foolish in the extreme. General Ludendorff wrote in his war memoir, (page 266 German edition): "We soon gave up shrapnel. The training of the troops was not sufficiently advanced for such a delicate operation. H.E. with instantaneous fuze was universally preferred," and I can well understand it. In stationary warfare this type of projectile, which had conclusively proved its value in moving warfare, had to retire into the background as there were seldom suitable targets for it. After long storage in the battery position under very unfavourable conditions the fuzes were often completely ruined. A battery commander reported in 1918 that, out of 300 shrapnel shell scarcely 5% burst,.and also many percussion shell were duds. It was however, not only the long storage of the shell that was the cause of the failure of the fuzes, as these were originally defective; most of the private firms which were employed on the manufacture of fuzes lacked the necessary experience to be able to turn out accurate mass-production. The greatest gunnery expert can do nothing with faulty equipment. With first-class ammunition, properly employed shrapnel fire is easier than using H.E. as it covers a much larger area than H.E. owing to its greater effective bursting-radius.

This latter point is of the utmost importance for unobserved fire. When, as in the above-mentioned example, an area of 1,000,000 sq. metres is to be searched and swept, to cover the ground once effectively with proper dispersal of the rounds, one requires between 1,000 and 2,000 shrapnel shell; at a range of from 2,000 to 4,000 metres a field-gun shrapnel shell effectively covers 500-1,000 sq. metres. When using guns with a flatter trajectory, as will certainly be done in the future, a considerably smaller quantity will be required. The opinion as to what area is effectively covered by one H.E. shell varies; in French books it is given as 30 sq. metres for a 75 mm. shell; in my very liberal estimate it is about ten times as large. Undoubtedly in its effective bursting-radius the H.E. shell is far behind the shrapnel. The explanation lies in the rapid loss of impetus of the irregularly formed H.E. splinters, and also in their irregular dispersion, a large number remaining in the ground, others flying vertically upwards to fall again harmlessly.

To sum up, one should prepare for observed fire in moving warfare and should endeavour to surmount all the difficulties allied therewith, to which I do not attempt to be blind. But as soon as earnest resistance is encountered one must take all measures necessary for stationary warfare. Unobserved fire also has its difficulties which one must not despise. If in moving warfare one dispenses with observed fire, one kills all initiative of the C.R.A., who is thrown back on mechanical unobserved fire, which in all cases demands much ammunition. On the other hand, this method of fire can be perfected by thorough study, and units can be instructed in it by a game similar to the war-game. I

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should like, while on this subject, to recommend two articles in the *Revue d'Artillerie* : " Organisation sans matérial spécial de séances de tir en chambre," and " Le reglage muet ou ' calculé ' du tir de l'artillerie." Such study naturally takes for granted that another spirit exists in the Artillery School to that of former days, which Hauptmann Becker describes in " Technik und Wehrmacht," 1921, page 102, as " an antipathy to everything which smelt too much of science."

Part II.

By COL. FREIHERR von WEITERSHAUSEN (retd.),
GERMAN ARMY.

Translated by Lieut. W. L. Gibson, R.G.A.

Although two articles have already appeared on this subject in the *Militär Wochenblatt*, I should like to add a few remarks, as I had many opportunities as a regimental C.O.[1] and C.R.A. of collecting experiences in the offensive. Without under-estimating the valuable suggestions and conclusions arrived at in the first article, I should like in the main to support the ideas of Lieut.-General Rohne. Successful command of the fire of a large number of batteries on an open battlefield in the offensive is not such a simple affair, and no great result will be obtained by searching an enemy zone at the order of the G.O.C. Owing to the ignorance which must exist as to the enemy's division of his forces, and from which, at the commencement of a battle, the G.O.C. usually suffers, so much ammunition would be wasted that its replacement would be impossible. Although we had such wonderful success in 1918 with unobserved fire, one must always remember that this was due to reconnaissances carefully carried out before the offensive. One cannot say that the fire was done without observation, although it was not what one usually understands by observation. By it the effectiveness of the fire was ensured, and even in moving warfare one cannot dispense with effect. The anxiety as to whether one could in the time available find the necessary number of O.P's. is unfounded. Lieut.-General Rohne is right when he says : " First the O.P.—then the battery position." The question of quick discovery of suitable O.P.'s will be more easily solved by attaching groups of artillery to infantry formations. A united artillery advance and command, as we were accustomed to before the war, is no longer possible. In the offensive I made several groups of mixed calibre, from field guns to the 21 cm. mortar, from the batteries at my disposal.

[1] The Divisional Artillery consisted of either 2 regts. of 2 brigades each, 3 batteries in each brigade; or, later on in the war, of one regt. of 3 brigades, each of 3 batteries. One bde. always consisted of field hows., the rest of 77mm. field guns.

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Each infantry regiment was allotted one group which did duty in the regiment's tactical zone. I retained several groups at my own disposal, which were then employed by the division where required. The divisional commander can only give *general* instructions as to the target for the artillery, its order in battle and the ammunition to be expended, the rest is the artillery commander's job. The artillery attached to the infantry naturally has its liaison officer, and the F.O.O. must of course be with the most advanced infantry detachment. Consequently the artillery will be just as well informed as to the movements of the enemy as each infantry commander. Thus a basis is given for a practical control, although in some cases every shot will not be able to be observed; but instead the shelling of a given area can be carried out.

The first order of the C.R.A. for the reserve groups was as a rule given by the map and under instructions from the division. This however, did not absolve the batteries concerned from the duty of providing means for observing fire by F.O.O.'s who should, as soon as possible, make liaison with the infantry. I never encountered any insurmountable difficulties in doing this.

In the offensive the chief tasks are to cover the roads and villages in the area in which it is presumed that the enemy advance will take place with fire, and to engage the enemy infantry with *all* the artillery at one's disposal. If the enemy artillery is in covered positions, it cannot be engaged at first. Not until the further development of the battle will it be possible, by air or suitable ground observation, to bring effective fire to bear on enemy batteries which have been unmasked. It would be a criminal waste of ammunition to attempt an indiscriminate searching of the ground to neutralise enemy batteries whose postions were unfixed. Observation of individual rounds is unnecessary if weather conditions are taken into consideration. Concentrated fire must be the rule. Only in the case of targets moving forwards, backwards or sideways is the observation of individual rounds of value for ranging purposes. At first sight it might appear that, by the separation of the various groups, a frittering away of the weight of the artillery results. This is avoided by the powers of the C.R.A., who is allowed, according to the situation, to collect groups together and employ them where required.

To connect up the O.P.'s and the batteries and brigades quickly an expert signal service is required, and only special signal sections attached to staffs and batteries can do the work, as I have repeatedly pointed out in my former articles. The calculation of the amount of ammunition required must be left to the C.R.A. as a knowledge of the capabilities of the various calibres is necessary.

An accurately working creeping barrage cannot be carried out by the whole divisional artillery in the offensive; but the groups working with the infantry can considerably lighten the advance of the latter by frequent "lifts." As regimental commander I have often done this. The C.R.A.'s job is then to control the fire of the other groups. Even in the offensive one can employ gas-shell as well as H.E., and this can be done without damage to one's own infantry.

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In the question as to whether one should use shrapnel or H.E. I cannot agree with Lieut.-General Rohne. Shrapnel is doubtless a good projectile, but in its serviceability for war purposes considerably inferior to H.E. This comes from the difficulty of regulating the time of burning. This is dependent in the first case on the quality of the work in the manufacture of the fuze, and secondly on the training of the battery commander; in a long war both factors deteriorate considerably, and as experience has shown, the war value of shrapnel is greatly influenced by them. Even in peace I discovered that many battery commanders could not master the process of shrapnel fire. In peace one will certainly get better results per cent. on *targets* with shrapnel than with H.E., but against thickly armoured and protected targets, as found in war, the result will certainly be different. Against these the H.E. shell has an incomparably greater effect than shrapnel with its small penetrating power. The moral effect of bursting H.E. is, according to all war experiences, much greater than that of shrapnel, with its almost noiseless burst and resulting negligible damage.

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A FIELD ARTILLERY GROUP IN THE SURPRISE.

By COLONEL W. H. F. WEBER, C.M.G., D.S.O., R.A.

CHAPTER I. PRELIMINARY; MORAL.

The late Autumn of 1917 found several divisions of the British Army on the Western front very happy, for they had escaped from the Passchendaele ordeal. Some were on the way to Italy, where things might be better and could scarcely be worse, and which in any case held novelties and romance for such as cared for it. Amongst the happy ones was the old 6th Division, pulled out from months of trench warfare about Lens for their turn at what the Army called the "blood-bath," but whom a lucky turn of fate had headed away on a mysterious errand down South.

The 6th Division, as one of the units of the Expeditionary Force, would, one had thought, have participated in the earliest fighting. However, fear of invasion kept it intact at home for some time, so that it missed the 1914 Retreat—there was a 1918 Retreat, too. It was on the Aisne, but received only the outskirts of the storm called by us the First Battle of Ypres; it missed all but the aftermath of the Second Battle of Ypres. To a long period of trench warfare in "the Salient" had followed a turn on the Somme, where it had the misfortune to meet an enemy strong point, named the Quadrilateral, not far from the notorious village of Guillemont. That encounter explained a considerable change in the personnel of the division, but there followed more trench warfare in the Spring and Summer of 1917, so that considering its antiquity the 6th Division may perhaps have possessed a more marked pre-war flavour than any other in the army, its time on the Somme having been its principal experience of the really bloody battle.

Even now, at Cambrai, it was to find itself at the point of a (new) salient, while enemy hordes chose, in accordance with principle, to batter at the re-entrants; the debacle on its right would not suffice seriously to implicate the division, while the furious German attack on its left rear about Bourlon would scarcely at all affect it.

The 6th Divisional Artillery shared in this emission of a pre-war aroma, which could be detected by any experienced artilleryman in either its wagon-lines or its gun-pits, and gave outward and visible signs of its existence at the I Army horse-show in May '17. Such a condition undoubtedly presents more advantages than disadvantages, but there were certain units which had not yet undergone that great metamorphosis which *must* come some day in a long war—comparable to the change which comes over a family when the elder generation is laid to rest.

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Within one year, approximately, the effects of battle were to be experienced to the full—in the course of which another Quadrilateral was to figure; the armistice would find this divisional artillery, perhaps not less efficient—for what is lost through casualties may be gained through experience—but profoundly changed in character. In this process, events at the Battle of Cambrai played a very important part—at any rate as far as 2nd Brigade R.F.A. was concerned; and they gave, not only to that unit, but to all present, an invaluable fore-taste of what was to come in 1918; for by November, 1917, the demon of trench warfare had us fairly by the throat, and control from behind was at its height; more than this, we had since July, 1916, been imposing *our* will on the enemy.

CHAPTER II. THE APPROACH.

In the last days of October, 1917, 2nd Brigade R.F.A was "in rest" near Aire. The Bde. Commander was engaged (i) in the study of numerous memoranda concerning the nature of the Flanders fighting, and (ii) organising a rough practice camp where the guns of the 6th Divisional Artillery could be calibrated in the old-fashioned way. These preparations were suddenly cut short by an order to march on the morrow—not North, but South; there followed some pleasant days. We had no idea what was to be our fate or destination; the Caporetto debacle had recently been announced and it was known that several divisions were for Italy, but we were surely marching in the wrong direction for entrainment? As the march went on, and other movements were noticed besides ours, it was permissible to guess in the manner of Bairnsfather's "Old Bill" that a "blinkin' offensive was coming off"—but where, and how?

Eventually we halted not far from Albert, headquarters of III Army, in an area where houses still partly existed, and in the course of a few days some of us learned that we were to participate in a Surprise—with the assistance of many tanks and a large force of cavalry; that secrecy was all-important; that great hopes were entertained of the operation, the result of which nobody could foretell; and that 6th Division was to be one of those forming the spear-head of the attack. Further, we learned that the barrage was to be unregistered, fired from guns to be calibrated in the back area by a new method. Of course the minimum of impedimenta was to be kept with the troops. We had indeed progressed if all this really came off! For the struggle for the Passchendaele Ridge was still going on and the enemy's attention would be held by this and his eyes fixed on those parts or on Northern Italy.

The new method of calibration, to ascertain the so-called muzzle-velocity (M.V.) of each piece, interested all ranks of the artillery, whatever may have been their doubts as to its efficacy. The elimination of "registering," as well as of the preliminary bombardment, must undoubtedly wipe out one of the great obstacles to Surprise, which the whole army had long since realised as essential to success, but which it had not been within a long distance of achieving to its

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satisfaction; the men had never understood why we should keep hammering at the same place after the enemy was once thoroughly prepared, as we had done on the Somme and at Arras and were still doing in Flanders. Somewhere in Ludendorff's book occurs the remark that the Germans imitated in March, 1918—without tanks, of course—what we had done at Cambrai; but at the time of the assembly of troops for this Surprise, one was told that we were imitating what the Austro-German army had done on the Caporetto; to borrow a phrase from the old F.S.R., Part I, the "best type of war is a methodical progression from idea to idea." Then, too, the notion of using tanks *en masse* was not new to the junior ranks, and everyone was keen to see it tried in practice. The massing of cavalry to exploit success was assuredly no new phenomenon—but we hoped that this time they would get their chance (in return for drinking up the water). Lastly, we were to abandon to a certain degree the theory of the limited objective, conceived at Neuve Chapelle, born at Loos, and now grown to full manhood in Flanders.

After seeing some calibration, the Bde. Commander went "on urgent private affairs" to Paris,[1] whence he returned to find 2nd Bde, R.F.A., bivouacked in Manancourt Wood, endeavouring to dry itself after the wettest night march on record.

Here may be mentioned the means adopted to conceal the concentration from the enemy:—

(i) No troop movements by day.
(ii) Working parties at night only; all work camouflaged before dawn.
(iii) All troops accommodated in woods; no fresh wood on fires after entering stables (but lights allowed inside tents or shelters); exercise and watering-orders along the fringes of woods.
(iv) Every unit maintained an aeroplane sentry by day.
(v) No names mentioned on telephones; new wires forward of a certain line not to be used before zero.
(vi) No guns on new positions till latest moment possible.
(vii) A quiescent attitude on part of troops holding the line.

At first only battery-commanders were informed as to the positions, which were not taken over by them till 14th; these positions had been chosen by the troops occupying the line, and ammunition (by this time very wet) dumped thereon; they had been allotted numbers and were invariably spoken of by those numbers.

[1] Where, besides seeing M. Sacha Guitry in "L'Illusioniste," he enjoyed some most pretty eating; our French friends may not have approved of the gaiety prevalent in England, but they certainly did not cut the quality of their cuisine! The return journey was indicative of the times; rail to Amiens, motor-jump to Corbie, lorry-jump to Peronne, whence, not being able to find floor-space in the "officers' rest-house" established by the B.E.F. Canteen in a ruin, the writer was rescued by an American officer, to enjoy the hospitality of some newly-arrived American Engineers. It is true that he did not get many hours rest in that most pleasant company, but, when conducted by "scooter" next morning along the light railway from Epehy to Fins, he was no emptier for his house had been full. Thence by a luxurious limousine, which certainly never expected such vile treatment, to Equancourt, and from there on his trusty steed to his poor wet brigade, where there was as yet no home.

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There was a considerable amount of work to be done on the positions *before* zero, in the shape of approaches, preparation of headquarters, floor-emplacements (guns were to be sunk axle-deep at most), trail logs or fascines, collection of material for work after zero. Obviously some positions, being less exposed, could be better prepared than others. There were also signal communications to be laid (after the system of command had been decided), observation to be arranged, a visual scheme prepared, alternative positions and routes for advance reconnoitred, ammunition supply, moves of wagon-lines treatment of casualties, etc., to arrange. In addition, it was essential that officers should know their way about our lines and study the lie of the land in enemy territory; when one remembers that we were all strangers in the district, and that movement by daylight was forbidden, it will be understood that the hours of darkness or semi-darkness were "periods of increased activity."

On the 17th, it was possible to announce the composition of the Right Group under O.C. 2nd Bde. R.F.A.—which as usual meant the splitting up of the Brigade Staff; the location of bridges over our trench system was notified—we were advised to follow tank routes in advance over the enemy system. On that day also, infantry of 6th Divn. took over defence of the line, while C.R.A. 6th Divn. was to assume responsibility at 17.00 hours on 18th. He appointed his F.A. Bde. Commanders as his deputies for that purpose. Arrangements must forthwith be made for the artillery defence, for which the Right Group Commander used two Batteries from outside 2nd Bde. R.F.A. and gave out the necessary S.O.S. Lines and arranged defensive concentrations, liaison, registration by the two selected batteries (by single rounds), and communications to a certain (formerly battalion) headquarters in the Villiers Pluich—Beaucamp road. This defensive responsibility entailed the O.C. 2nd Bde. R.F.A. leaving his batteries under the senior battery commander, the brigade thenceforth forming a sub-group. The barrage maps and special instructions had not yet been issued when the Bde. (now Right Group) Commander went up to the line on the afternoon of 18th

A set of instructions was issued by the 6th D.A. late on 17th shewing the final signal and ammunition-supply arrangements. The instructions dealt with certain other points as follows :—

(a) Trench Mortars; task ceases zero + 5′; personnel to man any captured guns.
(b) Preparation by R.E. and Pioneers of forward roads and pack tracks, the other side of our trench system: our artillery told not to use H.E. against any known roads on our line of advance.
(c) Warning against possible booby-traps in enemy trenches; this was hardly necessary, but the lessons of the enemy withdrawal in the Spring were not yet forgotten.
(d) Complete list of Report Centres (selves and neighbours).
(e) S.O.S. Signals of various Corps and the Cavalry.

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(f) Aeroplanes to give special signals warning us of enemy counter-attacks.

(g) Water-supply—units to carry biscuit tins.

(h) Certain instructions *re* care of our own pieces, and information as to Mobile Workshops, 1.O.M's., etc.

The above-mentioned signal instructions demanded considerable amplification as to details within the Right Group; personnel had to be found from the batteries for orderly-work, visual stations, transmitting stations, sub-exchanges, and in particular a Forward Communication Party (from which great things were expected); there was wireless this time—not to be used for messages "in clear," of course; a special iron ration issue of cable was given out; operation messages were to be sent, if possible, by orderly. All this was seen to and settled on 18th. No doubt great demands were made on the signallers, though such things do sometimes read more alarming than they really are.

His written Operation Order was not issued by the Right Group Commander until the last possible moment on 19th. It announced the extent of the initial attack from Banteux to Havrincourt, and the flanks of the 6th Div. (Villers—Marcoing railway and a trench called Coalville Lane); gave the enemy opposite us as 27th R.I.R. of 54th *Saxon* Division; 6th Div. to attack with 16th I.B. on right and 71st I.B. on left—18th I.B. in reserve, to advance through 71st I.B.; 29th Div behind 6th Div., and cavalry behind that; 16th I.B. to attack with 2/Y. & L. R. on right and 8/Beds. on left; Right Group supporting 16th I.B. to consist of 2nd, 17th, and 181st Brigades R.F.A.; Field Artillery task involved bombardment of a series of lines —not quite the usual "creeper"—and the use of a deal of smoke; Tanks to assemble behind our trench system and start at zero minus 10; 17th Bde. R.F.A. would be the first to advance; zone calls to be answered by 181st Bde. R.F.A. The contents of this order were to be communicated to the men after dark on night Y/Z (19/20). There were the usual number of special instructions for certain batteries outside the normal tasks as given on the barrage map. Curious to relate, it was only necessary to make one serious amendment after the very last orders had been issued. Thus we became ready to Surprise. See Position 1 on map.

Comments.—Military records and descriptions of war, unless intended for the front page of a popular journal, seldom bring to the reader's understanding such things as the conditions of life of the participants; even moral, though pronounced on all sides the most potent factor, generally receives only academic notice. It is as if we hear at the club that X. "has lost a fish"—interesting to Y., sometimes, perhaps, not unpleasing to Z.—but not disclosing in any way the thrill that X. got when the fish caught hold, the excitement of a few minutes' play blotting out the rest of his world, and his passionate disappointment at the loss.

In the days preceding the assault there was a genuine excitement amongst the men, very different from the anxious foreboding usually

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experienced. *All ranks played up for secrecy*—and attained it, aided of course by the cloudy weather which impeded activity in the air, but *aided still more by the passive attitude of the enemy* opposite us. It is true that at the last moment he captured a man or two from one of the newly arrived British divisions, but fortunately too late to prevent the Break, whatever the results may have been as to summoning of reserves. (Of British reserves there were unluckily all too few, but the writer does not intend here to enlarge the scope of his comments on that point.)

The controlling powers justly endeavoured to decide the minutest details up to zero hour; of course there were bound to be more than the usual number of "ifs," for it was a gamble on massed tanks and Cavalry, comparable to the German gamble on gas in April, 1915. How control was practised after the troops had effected the Break, and what happened to it when the enemy in his turn achieved Surprise, can be gathered to a degree from the ensuing chapters; but some, at any rate, of the controllers crossed the Rhine a full year before their fellows.

The troops used to trench warfare conditions undoubtedly found very trying such things as the rather haphazard arrival of materials, bad storage of ammunition, lack of registration, absence of billets, etc.; in 1918 they were used to all this, but we had not got so far.

An interesting point was the arrival of the tanks by train, their assembly in the woods, and their advance to the line of departure (better known as the "jumping-off place") under what noisy cover a few guns could provide.

Another thing to notice is the relief of troops holding the line prior to a surprise. The sooner it is done, the emptier becomes the area and the better the new troops become acquainted with the country; but, on the other hand, the later it is done, the less chance of capture of individuals from the recently arrived formations; and perhaps this last argument is the most important. The French attack in Champagne in 1917 and the German attack about Rheims on 15th July, 1918, were both vitally affected by the capture of a few men from the attacker's forward troops. Anything which can be done to prevent such a mishap seems permissible, even to an unblushing bolt. The conditions in which the prospective assailant finds himself just prior to the attack afford the enemy a grand opportunity for counter-action, if the latter has but time to arrange such: it is unlikely that that enemy will attack on a large scale—if he did, he would find numerical superiority against him; but he can without insuperable difficulty make a partial offensive on a very limited objective such as seriously to disorganize the attack—vide the German action near the mouth of the Yser in the Summer of 1917; or he can retire as the French did on 14th July, 1918, and the Germans did (on a strategic scale) in the Spring of 1917; in either case he can plaster the attacker's assembly with H.E., or perhaps even better in some circumstances with gas. We are anyhow led to the conclusion that if (as the text-books say) the defender, while hanging on with his teeth and nails, must think

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of the counter-attack, the attacker can never dare take his eyes off the defence—and there is no earthly reason why the offensive should be the less resolute for that.

* * * * * * * *

In peace time anyone would have described the scene of these operations as an ideal battlefield. Perhaps there were not so many trenches as usual, but the wire and such trenches as there were made great obstacles for cavalry. The principles features of the battlefield at large were :—

(i) Flesquieres, a village on a hill, without capturing which the attack could not continue; it was held by us still to the last moment in March, 1918.

(ii) Bourlon Wood, a point d'appui of the first importance on the N.W. flank of the new salient; tanks and H.E. put our infantry into it, and gas drove them out; it possessed two outposts, which were always changing hands—the villages of Bourlon and Fontaine Notre Dame.

(iii) The Canal de l'Escaut, which was held responsible for the failure of the cavalry exploitation, but which was crossed by a Canadian mounted detachment.

(iv) The villages of Gouzeaucourt, Gonnelieu, and Villers Guislain, pivots of the give-and-take struggle on the S.E. flank of the new salient.

(v) The towers and spires of Cambrai visible to the N.E.

Of special importance to the 6th Division were :—

(a) The Grand Ravin which was followed by the Havrincourt—Ribecourt—Marcoing road, a concealed avenue, fairly narrow but unenclosed;

(b) The cleft, along which ran the roads and railway from Villers Pluich to Marcoing, and which acted as a natural flank to the 6th Divisional area;

(c) The high ground about La Vacquerie, whence the enemy could easily observe our concentration if carried on in daylight, and our advance if he were not himself attacked;

(d) The little country town of Marcoing, and the village of Ribecourt, an important road junction;

(e) Nine Wood, or Bois de Neuf, lying on high ground, in peace time no doubt of importance from the point of view of "chasse," but during these times the observation centre of the whole area.

As usual, the villages had, from a distance, the appearance of woods; except along the main roads where there were the usual poplars, there was not a tree to be seen outside woods or villages, the whole area having been intensively cultivated.

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CHAPTER III. THE BREAK. (NOVEMBER 20/21).

20th. Zero hour (06.20 hrs.) arrived—"Time and Tide they wait for No Man, No Man, No Man." Surprise was achieved.

Without waiting for precise information as to events on the flanks, Brigadier 16th I.B. went forward soon after 10.00 hrs., accompanied by Right Group Commander. There was a hasty visit to the four battalion commanders, all in great heart, to get news; the only fire came from a single 77 mm. gun, obviously at quite close range, and probably one of those captured later N.E. of Flesquieres.

Group Commander then went forward, nearly to Marcoing, and at 12.00 hrs. sent a message to 6th D.A. to the effect that our infantry, probably the 29th Divn., were ascending the slopes beyond the Grand Ravin on their Way to Nine Wood; he could give no information as to events on the right except that the cavalry were advancing, but on the left it appeared that we were not yet established in Flesquieres; the before-mentioned 77 mm. gun had ceased rather before this to annoy us. Returning at 12.15 hrs. he met the first battery of 16th Bde. R.H.A. (29th Div. Art.) advancing; he requested permission to advance 2nd Bde. R.F.A. and sent for its battery commanders. The weather had taken a turn for the worse and it was now very wet.

B.C's. 2nd Bde. R.F.A. duly arrived for a reconnaissance, but brought word that the Bde. was to be prepared to join the cavalry "N.E. of Cambrai"; also that 21st and 42nd batteries had been told to advance alongside 53rd (most advanced) battery, which lay N. of Villers Pluich—Beaucamp road. Later he received instructions that 2nd Bde R.F.A. was *not* to advance, so he returned to Bde. Hdqtrs., leaving the Forward Communication Party with 16th I.B. Staff. On arrival at his signal office he found a message that 2nd Bde. might now advance, but it was by this time nearly dark; so he decided to concentrate the Bde. on its gun positions, ready for whatever the next situation demanded; there was some confusion owing to the fact that battery wagon-lines had moved by order of superior authority unknown to battery commanders (3)[1]

Orders issued on the evening of 20th gave the situation as follows: 29th Div. in front line, 6th Div. in support; 2nd Bde. R.F.A might have to move with cavalry or its own infantry; much depended on course of events about Flesquieres; readiness to move at dawn, B.C's. accompanied by battery staffs. Right Group had ceased to exist as such, for 17th Bde., R.F.A., had joined 29th Div., and 181st Bde., R.F.A. (its own) 40th Div.

21st. A reconnaissance was made at daylight, in the course of which we learned that Flesquieres was now in British possession; no further orders were received. 6th D.A. Hdqtrs. arrived later to take over (former Right) Group Hdqtrs. accommodation; it was therefore obvious that 2nd Bde., R.F.A. must advance, and a move was made

[1] See 'Comments' at end of Chapter.

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at 10.00 hrs., B.C's parties in front, through Ribecourt. A temporary position (No. 2 on map) was occupied (near the Hindenburg Support Line) about L 20 d.

Bde. Commander then went forward and visited 86th I.B. (29th Div.) and 16th Bde., R.H.A., in Marcoing, where one had found any amount of enemy material, food, trophies, etc.[1] Hearing there that Noyelles was securely in our hands, Bde. Commander advanced 21st and 87th batteries some hundreds of yards, to shorten the range (Position 3 on map); he then visited Nine Wood whence a fine view of the country could be obtained. While there news reached him that Cantaing had been captured by our neighbours. Accommodation for Bde. Hdqtrs. was fixed up in Marcoing, and wagon-lines were ordered forward and later established in or about the village of Ribecourt (3).[2] During the afternoon, while Bde. Commander was at Nine Wood, battery commanders were reconnoitring the forward area in view of the almost certain order to advance. Dispositions were reported to 6th D.A., and were approved, with an important *rider to the effect that it would be advisable to get closer up.*

2nd Bde. R.F.A. Operation Order that night announced that 16th I.B. (6th Div.) was relieving 86th I.B. (29th Div.) forthwith; that 16th Bde. R.H.A. would be relieved of responsibility for support of (the new) 6th Div. frontage at 09.00 hrs. on 22nd; gave S.O.S. lines for night 21/22 to all batteries; ordered 21st and 53rd batteries to advance at 05.00 hrs. on the morrow (22nd) to L 16 d 2/0 and L 22 a 5/3 respectively, and to complete registration from those positions by 09.00 hrs.; 42nd and 87th batteries to advance, 42nd to near 53rd battery, and 87th to certain quarries immediately W. of Nine Wood, as soon as the 21st and 53rd had "shot themselves in"; located 2nd Bde. Hdqtrs. at L 22 a 9/1.

Comments on Chapter III.

(1) The sad part of this chapter is its brevity. By the evening of 21st all chance of break-through was over; if the advance was to continue, it must be by renewed attacks without the advantage of surprise. The question is, at what moment could the cavalry have been effective? May be there was still a chance on 21st, if the Canal de l'Escaut could be crossed—it *was* crossed by a Canadian mounted detachment on 20th, some of whom are alleged to have penetrated into Cambrai (where they were rounded up), the rest returning the way they came after an exciting ride and an efficient performance. Public opinion on the spot inclined to the view that their best chance of far-reaching success was on the afternoon of 20th; if this was so the cause of failure was the delay before Flesquieres, for which ample troops were available on either flank but were not used;[3] the tanks

[1] The notepaper found was not yet exhausted when the Germans endeavoured to recapture it on 21st March, 1918. In addition there was some very sour Rhine-wine, and an officer's clothing store with a wealth of decorative hats for souvenirs.

[2] See 'Comments' at end of Chapter.

[3] Camp gossip had it that "amour propre" caused certain officers to refuse the offers of help pressed on them by their neighbours.

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accompanying the troops responsible for the capture of Flesquieres were held up by, and suffered heavy casualties from, German field-batteries (in the open) E. of, and quite close to, the village. This was probably the best opportunity that cavalry had had since the opening of position warfare; but it was missed, if indeed it ever existed; a barber in Rhineland told the writer that he was at that time observing for a German heavy battery, and that, when the German field-guns near Flesquieres were put out of action, there was no one between him and the British and no German infantry that he knew of within miles. With that one must consider the measure of success attained by the above-mentioned Canadian detachment. The writer has never heard what exactly were the orders given to our cavalry for the whole operation; no doubt they will one day be published, but, whatever they were, the chance for effective action was gone by the evening of 21st.

(2) The great attack of tanks *en masse* had been tried, and very successful it was—and gave an important line as to future handling of tanks, which eventually produced, or much assisted to produce, a decision on the Western front; many people were of the opinion that tanks should never have appeared on the battlefield until they could be used as they were at Cambrai—but iet that be. At the time we field-gunners thought that our barrage was redundant and that it even *interfered with the Tanks*, but of course one must consider it as a second string in the way of protection to our infantry—i.e., should the tank enterprise have failed; this is not to say that the field artillery use of smoke was anything but valuable; it is probably an essential to a tank assault, and tanks may in future produce smoke for themselves, like a warship. That tanks can be held up, in limited number, if the moral of the defenders is sufficiently high, is shown by the disaster which befell so many of them at the hands of a few German field-guns (and howitzers) at some hundreds of yards range E. of Flesquieres; it was said[1] that a German artillery-officer continued personally to handle the last of these guns up to the moment when he was shot by the British infantry advancing across the Grand Ravin; the writer is unable to verify the story in detail, but something of the kind no doubt occurred, and we must render this officer the homage due to his gallantry—and can learn something for ourselves from his action; the tank cemetery was optically obvious to those who advanced through Ribecourt on 21st.

(3) Some points in connection with "wagon-lines" seem worth notice. The shifting of battery wagon-lines unbeknownst to the battery commander is not only administratively inconvenient, but can easily lead to serious inefficiency at a critical moment; it should not occur. The question as to who should originate the order to shift wagon-lines during an advance, whether D.A., the Group Commander, or the battery commander, was raised in another paper,[2] but in any

[1] The incident is, in fact, mentioned in Sir Douglas Haig's despatches.

[2] "A Field Artillery group in the General Advance."

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case the battery commander must be warned of the order to move. A very old mistake was made on 21st, the lure of houses (or rather ruins) proving once again irresistible; Ribecourt was an important road-centre and a certain target; needless to say we suffered for our temerity, for, as early as the night 21/22, 87th battery wagon-lines were badly shelled; of course at the moment further advance was expected, but————

(4) An impression was prevalent in the forward area that, at the end of a long period of trench warfare, subordinate commanders were more ready to assume control than the controllers were to give it up; that may be a one-sided view. On the other hand it became obvious at this quite early phase of the war of movement that many individuals amongst the subordinate commanders did not shine with the brilliance expected of them from the experience of the past years, for trench warfare had habituated them to slow decisions, if not to the habit of waiting for orders.

CHAPTER IV. THE HOLD-UP (November 22/29).

22nd. The moves as ordered duly took place; batteries registered, and the usual communication, S.O.S. duties, and liaison, etc., were arranged. Position 4 on map. 2nd Bde. O.O. issued that evening announced that 16th I.B. (which 2nd Bde. was still supporting) was to consolidate its position, the left battalion swinging up somewhat to meet the neighbouring troops near Cantaing. But at 17.45 hrs. a message was received from D.A. saying that "6th Div. was to form a defensive flank"—apparently in view of intended attack by our neighbours from Cantaing on the morrow (but there is no copy of this message amongst the writer's records)—and that "all batteries were to withdraw to the neighbourhood of the Hindenburg Support Line."

The only other incidents worth mentioning this day were the severe shelling[1] of 42nd battery wagon-lines and a direct hit[1] during night 22/23 on the house in Marcoing occupied by 2nd Bde. headquarters.

23rd November was a very busy and decidedly unfortunate day. A reconnaissance for new positions in accordance with last night's message was made betimes. 51st Div., now on our left, attacked Fontaine Notre Dame with tanks; the tanks got beyond the village, but the attack was unsuccessful—probably due to m.g. fire from La Folie woods, which 2nd Bde. R.F.A. was engaged in shelling vigourously throughout the day. This attack produced heavy hostile fire all over our area, and some gas in Marcoing; 42nd battery suffered severely, losing 3 officers, 5 sergeants, and several others, on its new

[1] A young officer from The Shop, applied for by Bde. Cdr., reached his battery wagon-lines to be thus welcomed; he was in the room which received the direct hit that night; at his battery gun-position during the bad time next day; he was sleeping under a wagon between his B.C. and senior subaltern on the night 30 Nov./1 Dec., when one was killed and the other wounded; and was himself severely hit on observation in Nine Wood on 3/Dec.—Such is the fortune of war!

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position (1);[1] another officer was hit on liaison in Nine Wood, and 2nd Bde. Signal Officer severely wounded outside Bde. hdqtrs.; 87th (How.) battery had casualties in the quarries W. of Nine Wood. Batteries had to withdraw piecemeal, at dusk to their new position (No. 5 on map), while maintaining our defensive responsibilities; it had been promised us that during their withdrawal other R.F.A. units should cover our zone, but the units concerned appear never to have received the order to do so (2). At the same time all wagon-lines, tired of the attention they were receiving from the enemy at Ribecourt, were withdrawn to the neighbourhood of Villers Pluich, which proved later to be an abode of anything but rest. The 4 batteries had now, between them, occupied 16 gun-positions since they left their zero hour points.

On this day it was notified that Bourlon Wood was in British possession.

24th. On 24th, 16th I.B. and 2nd Bde. R.F.A. hdqtrs. moved out together to dug-outs at L 21 a 5/5. A considerable amount of reconnaissance was carried out, night sniping arranged, and other normal trench warfare conditions resumed.

25th. Orders were issued for support of a serious attack by 29th Div. on our right, but this attack did not take place.

It was announced that the line to be consolidated by III Corps ran, high ground in G 21 a — Lock in G 17 d — L 11 c — L 10 b — L 4b 0/5, with posts well in front; it will be seen that the line of resistance ran round Nine Wood. The dividing line between 28th and 6th Divs. ran L 17 c 0/2 — Grand Ravin to L 21 d 8/2 — L 32 c 8/0 — R 7 d 1/0.

Bde. Commainder gave priority of battery work as (i) accommodation for personnel, (ii) protection of ammunition, (iii) protection of guns; one must remember it was now winter. The dump to be maintained was fixed at 252 r.p.g. 18-pr. and 204 r.p.g. 4·5″. 24th Bde. R.F.A. on our left, was crossing its fire with 2nd Bde., because of the shape of the ground, and protected right battalion 16th I.B. Two heavy-artillery groups were within call.

Guards Div. was now on our Northern (left) flank, and at 14.00 hrs. a Guards officer told Bde Commander that we held Bourlon village except for a few (surrounded) enemy posts. The Guards' line met 6th Div. about L 4 central.

26th/29th. A readjustment was now ordered, to take place night 26/27. 6th Div. would put two I.B's. in the Line; 71st I.B. (in relief of 16th I.B.) on right, supported by a Right Group consisting of 2nd Bde. R.F.A. and 112th battery of 24th Bde. R.F.A.; 18th I.B. (in relief of 1st Guards I.B.) on left, supported by a Left Group consisting of 24th Bde. R.F.A. (less 112th battery) and (on 29th November) 277th Army Bde. R.F.A.

Up to the evening of 29th, the daily, and almost all-daily, offensive task of Right Group was the shelling of La Folie Woods in support of efforts by the Guards to capture the village of Fontaine

[1] See 'Comments' at end of Chapter.

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Notre Dame, an important outpost to Bourlon Wood, the still more important pivot of operations in these parts. The Guards' endeavours did not meet with great success; Fontaine Notre Dame was never long held by us, and Bourlon village was constantly changing hands. Our defensive task was the consolidation of our position at the apex of the new salient, in which the most difficult item to secure was a properly protected O.P. in Nine Wood (3), which was to us what Bourlon Wood was to our neighbours—only that the advanced posts (Cantaing, Noyelles, and Marcoing) were firmly enough established in our possession.

Comments on Chapter IV.

(1) It is difficult to know why 42nd Battery came under such heavy fire on 23rd; whether it was seen occupying its position, or whether its flashes were visible from some enemy O.P.; personally, the writer believes this fire was in the nature of counter-preparation—directed on an area, rather than on a target. Whatever may have been the cause, the trouble of 23rd was the beginning of the great metamorphosis for this battery; it had but a few days previously got a new captain; almost at this moment its quite excellent B.S.M. had to go sick; at Marcoing on 23rd it lost 3 subalterns and 5 sergeants—but worse was to come! Events at the battle of Cambrai completely changed the character of the battery, which never again showed its marked pre-war flavour.

(2) The nature of the war of movement had been so forgotten that necessity for strict compliance with an operation order or message was scarcely realised. For instance, on the evening of 23rd the necessary withdrawal of batteries had been most carefully timed so as to maintain possibility of support of the line—a highly important consideration at that moment. Batteries wished to move at the moment most convenient to themselves—all at the same time. We all know there are occasions when a subordinate thinks it best to act otherwise than in accordance with orders, and we know the conditions under which disobedience may be justified; but the last word on the question is that *by disobeying, one lets one's neighbours down.* This is rather harsh criticism; indeed any failure there was, was very likely due to some manner in which the orders were given—i.e., the fault of the orderer rather than the ordered; the matter is mentioned only to lead up to the thesis that in no point was the battle of Cambrai more important than in reminding troops, highly trained before the war to mobility, of the elementary conditions connected with the war of movement.

(3) One may compare our difficulty in employing to the utmost the excellent facilities for observation from Nine Wood to the difficulties doubtless felt by the Germans in using Mount Kemmel during the Summer of 1918.

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CHAPTER V. THE COUNTER-ATTACK (Nov. 30-Dec. 6).

30th Nov. Early on the morning of 30th there was heavy firing to the right (South), and a considerable amount of "stuff" fell in the Grand Ravin. After a short time one could see from Group headquarters (in L 21 a) masses of Germans advancing over the heights S. of Masnieres and our own infantry retiring. Later, there was obviously heavy fighting in progress in the direction of Bourlon (the left rear) also.

The enemy had, in his turn, achieved Surprise—Sir Douglas Haig calls it "local surprise." As usual, a number of people had expected attack; many people temperamentally expect hostile action; but in this case it would appear that subordinate commanders had definitely warned the authorities that counter-attack was imminent.

Reports of an alarming nature (capture of Gouzeaucourt!!) arrived from the right, and gradually also from behind, but on 6th Div. front it was quiet. Nevertheless, with the concurrence of Brigadier 71st I.B., Group Commander ordered the batteries in the Grand Ravin to withdraw by sections to L 19 d on the slopes N. of Ribecourt and to L 2 6 d on slopes E.S.E. of that village, his principal object being to get direct observation on the enemy, should they continue to advance; additional reasons were (i) the fact that the Grand Ravin was a sure target, (ii) facilities for getting away without traversing Ribecourt. These orders were obeyed by 21st, 53rd, and 87th batteries, but appear to have been misunderstood by 42nd; 112th battery sent 3 guns to L 32 central (W. of Bois Couillet ravine), maintaining the remainder at L 27 d 9/2 on E. slopes thereof; ammunition supply on the new positions was by "echelon" vehicles. Any surplus kit was returned to wagon-lines, which, coming under heavy fire (of course) at Villers Pluich, all moved to Havrincourt Wood.

Towards evening the situation seemed to be stabilised—we heard Gouzeaucourt had been recaptured by the Guards; the defence of our line having to be considered, Group Commander decided to move back to original positions; 21st battery did this, and 87th Hows. (only part of which had, for special reasons connected with the defence of the line, moved); before 53rd could comply, an order came from 6th D.A. that batteries were not to go forward again, so 53rd remained where it was, well placed for eventualities on either side of the Grand Ravin near Ribecourt; 112th battery also maintained its split position. See Position 6 on map.

By midnight communications were thoroughly re-established and ammunition supply seen to, but 42nd battery had lost yet another subaltern wounded.

Owing to the fact that its reports of this period went through the normal channel (O.C. 24th Bde., R.F.A.), no accurate description, unfortunately, can be given of the experiences during period 30th Nov./3 Dec. of 112th battery, commanded by Major W. S. Ironside, D.S.O., M.C., an officer who had landed with 6th Div. in France as a sergeant, and who was killed in command of 112th battery on 2nd

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Nov., 1918, near Le Cateau, to the intense regret of the whole division. This battery had enemy infantry within a few hundred yards at one time, it is believed, and on several occasions engaged infantry targets over open sights. As chance would have it, the telephone line from Group Hdqtrs. to 112th never "went dis" and the battery commander continued to discuss the situation through this exciting time with his usual unruffled equanimity. (The writer had believed that an account of 112th battery doings appeared in one of the early numbers of "The Gunner"[1] under a series of articles entitled "Some Episodes during battle-fighting on the Western Front (communicated by Major-General H. C. C. Uniacke, C.B., C.M.G.).

Night 30th Nov./1st Dec. At 01.00 hours on 1st Dec., an enemy shell landed on the wagon under which were sleeping the battery commander and two of the remaining subalterns of 42nd battery. The battery commander was killed and his senior subaltern severely wounded; 42nd battery was now left officered by a newly arrived captain and two, both recently joined, subalterns; it was suffering a perfect holocaust.

The death of Major N. B. Robertson, D.S.O., was one which the Regiment could ill-afford; he was the very type of a 1914 battery commander. For 42nd battery it spelled disaster; the 42nd battery *was* Major Robertson. Everything has the defect of its qualities and the qualities of its defects; the disadvantage of such personality lies in the fact that an awkward time occurs for a unit when that personality departs. Lieut. C. H. Wilkinson, M.C., CRX. DE G., was perhaps the best subaltern the writer had under him during his regimental service in the war; he died of influenza on his way back from New Zealand to rejoin 2nd Bde., R.F.A. in the Spring of 1918.

Immediately on hearing this bad news, Group Cdr. visited 42nd battery, to see that things were for the moment in order, and all batteries (except 112th, which there was not time to do); he also gained personal touch with the F.A Groups on either flank.

Dec. 1/2. There was a good deal doing, one way and another, on 1st. Right Group answered 3 S.O.S. calls—one in the morning in support of 29th Div. on our right, one at 13.45 hrs. in aid of Left Group supporting 18th I.B., a third about Rumilly for 29th Div., in which 112th battery were the chief participants. Our troops to the South had failed to regain the ground as far as Villers Guislain. 29th Div. held to their line, though it was said that the enemy at one time penetrated Masnieres; that night we definitely evacuated Masnieres and the new front line of 29th Div. was about 1,300 yds. away from 112th battery position. On the left, the enemy advanced on Cantaing, but was repulsed; there was again very heavy firing in the direction of Moeuvres and Bourlon Wood. In Right Group area, especially in the Grand Ravin, a lot of shells fell, which caused various casualties, including a slight wound to O.C. 53rd battery. 2nd Bde. R.F.A. had for the nonce lost its wagon lines and found it hard to

[1] Vol. 1., Nos. 5 & 7, contain under this heading an account of the experiences of some artillery units lying to our right (S.) on this day of many incidents.

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maintain battery ammunition dumps. Communications were not working well this day, and one had to rely to a considerable extent on visual through 53rd. A new commander appeared for 42nd battery.

After dark Major Robertson was buried to the accompaniment of 4·2 shells, which fell with persistent accuracy just far enough away to the right to allow the party to complete its sad task; it was indeed a soldier's funeral.

Daylight on Dec. 2 disclosed a number of strange batteries in Right Group area, chiefly in the Grand Ravin, where they had arrived during the hours of darkness. 6th Div. frontage (but not as yet Right group frontage) was extended owing to 16th I.B. taking over 87th I.B. ((29th Div.) line.

Dec. 3. By far the busiest day of this period was 3rd December. The enemy attacked all day on the Flot Farm—Rumilly front. At 10.45, 13.45, 14.20, 15.10 hrs., Right Group was engaged in answering S.O.S. calls. At 15.00 hrs. 112th battery said we had retired to West of Marcoing, and at 15.30 hrs. 71st I.B. thought Marcoing was in enemy hands; enemy patrols were reported at 14.45 hrs. to have been seen in Marcoing, having probably worked their way along the canal bank.

Although it turned out later to be incorrect that Marcoing was in possession of the enemy, a conversation with 71st I.B. resulted in a decision to withdraw batteries to the area approximately L 31 b, already reconnoitred by B.C's. With the approval of 6th D.A., the withdrawal was carried out, well and quickly, 42nd battery remaining in its position, to cover the right flank of our infantry still at Noyelles. Position 7 on map. An arrangement was arrived at with Left Group to extend their barrage, so that between the two groups the whole 6th Div. front could be properly supported.

After dark, 71st I.B. and Right Group Hdqtrs. withdrew together to Ribecourt. Between 23.00 hrs. on 3rd and 02.00 hrs. on 4th, Group Commander was able to visit all batteries in position along the Ribecourt—Villers Pluich Road. With a quiet night, the clearing of ammunition from the old positions and the re-establishment of communications was successfully accomplished.

To the right (S.) the enemy, who had already gained ground on 2nd, this day captured the important heights about La Vacquerie.

At 13.00 hrs. 2nd Bde. R.F.A. suffered a further disaster, in that an officer of 53rd was killed and the two remaining subalterns of 42nd battery wounded whilst observing from Nine Wood; the O.P. there had always given cause for concern; some sort of a trench had been dug for it, else the whole party would have been wiped out. Actually 42nd battery had in these 10 days lost its commander and 7 subalterns, amongst the officers only.

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Dec. 4/6. On the morning of 4th, C.R.A. 6th Div. met Group Commanders at Boar Copse (Le Bosquet) and announced intended general "withdrawal" to Hindenburg Support Line. The enemy use of gas against Bourlon Wood had proved too much for us. There was to be, after the withdrawal, a Group in support of each I.B.; the present Right Group would become Centre Group, losing 112th battery, but getting the whole 232nd Army Bde. R.F.A., (three 18-pr. batteries, no hows.) instead. In the afternoon the new Boar Copse positions were reconnoitred in detail. Later it was announced that the withdrawal was to take place this night (4/5/).

The retirement of the batteries required careful staffing, adequately to protect the rear-guard[1] which the infantry would leave in position until the new line was properly occupied (03.00 hrs. on 6th). In the event, leading sections of all batteries moved before midnight, to "warm" the new positions, while the bulk of remainder retired between 03.30 and 04.30 hrs. There was much hostile shelling, but the move passed off uneventfully, except for the destruction of one complete gun-team of 53rd battery. Position 8 on map.

Probably the enemy had not discovered our "withdrawal," for 5th was a quiet day; Right Group was duly grateful, there being an endless amount of things to arrange, especially as it was notified that 232nd Army Bde. R.F.A. was to leave Centre Group on replacement by 155th Bde. R.F.A. of which D/155 and B/155 joined (without ammunition) before dawn on 6th.

Further, one had to consider the possibility of still further withdrawal. The British Army was new to "withdrawals" at this period of the war; the experiences of the last few days had been somewhat alarming; many guns had been lost on our right; it was advisable to consider the circumstances under which battery commanders might have to chose between abandoning their guns after taking breech-blocks, etc., or fighting them to the moment of capture. Withdrawal can quite easily become a habit, so at least one seemed to be finding.

The night 5/6 in Ribecourt was about the worst the writer experienced throughout the war. There was no cover other than than from weather and the enemy kept up a terrific fire with large-calibre stuff on the village. Once again, one felt grateful to him for the extreme accuracy of his guns and the good training of his detachments! The points chosen by him as targets (road-junctions, of course) lay on either side of "where our caravan had rested"; each M.P.I. lay just, but only just, far enough away to give a little confidence, which looked like fortitude. There were many casualties on the roads about, and the "padre" nearly left this world of shells and sorrow for a better, brighter, area. At the very worst moment, 01.50 hrs. on 6th, news was received of expected enemy attack, and Right Group was ordered to carry out "Counter-preparation" on a big scale—the first

[1] Rearguard did not retire the whole distance, but remained on the line L 28 a 3/8 —Premy Chapel, which eventually became more or less an outpost line with only very distant artillery support.

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time this term had come to the writer's notice, except in translated German documents; there was to be heavy harassing fire from 02.00 to 06.00 hrs. and a sort of barrage from 06.00 to 06.30 hrs. All the lines had been broken, and it became necessary for the acting Bde. Signal Officer to use orderlies, whilst arranging visual. Strange to say, none of the orderlies were hit, and visual was established—a most dangerous period for the officer in question, for which he was justly rewarded by a M.C.; it was a really good performance, which resulted in all batteries opening fire by 04.12 hrs.

In the end there was no enemy attack, whatever may have been his intention; enemy fire had stopped almost directly our Counter-preparation proper began; our own shooting was stopped before 07.00 hrs.

During 6th, Centre Group Hdqtrs. moved to a trench dug-out (of a peculiarly "movie" nature) at K 36 a 6/0; Group Commander accompanied 71st I.B. headquarters to another locality, L 32 a 3/3. C/155 and A/155 came into line and the whole 155th Bde. R.F.A. was formed into a sub-group, 232nd Army Bde. R.F.A. also remaining for some considerable time with the Centre Group.

CHAPTER VI. THE AFTERMATH AND A NEW PRELIMINARY.

From this time on, the air was full of "war and rumours of war," for the Russian tangle meant almost certain attack in force by the Germans on the Western front. Details of defence schemes became matters for grave consideration, and soon the daily delivery began to consist chiefly of ideas how to meet the threat. First question, would the enemy produce tanks?

Apart from this general precautionary attitude, an attempt was expected from the enemy to complete recapture of ground won by us in November. Our new child, Counter-preparation, became an important personage directly she was introduced to us; not only was her name constantly on our tongues and in our correspondence, but also was she in these times a daily deed of dawn.

Trouble occurred at once in connection with alleged "short" shells at the point of the new salient. One eventually concluded that it must be enemy fire from captured 18-prs.; there seemed no other solution of the problem as to their source. In the writer's experience this almost always happened when operations resulted in the formation of a salient; short shells cause bad feeling; it is equally annoying for artillery commanders to be threatened with "disciplinary action" and for the infantry to have aspersions thrown upon their moral. Did the Germans, knowing from experience what happens, deliberately use captured guns against such a salient, at the risk of casualties to troops in their own re-entrant? One would think not; but sometimes, at any rate, it appeared that no British guns had been firing at the moment. A good aeroplane photograph shows both the artillery *and the infantry* where our infantry are, about which there has been known

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to be uncertainty. The principal trouble in this case seemed to be fire from somewhere W. of Ribecourt on to the ground S. of Premy Chapel; its source was never discovered and complaints were still being received at Christmas.

On 12th December, 19th Div. relieved 6th Div.—headquarters and infantry; that divisional artillery should remain "in" was also not unknown! There is a question, when this happens, whether Father should remain to care for his own children, or whether they should be left to the mercy of a step-papa; an argument for Father remaining is that a divisional artillery brigade without its own C.R.A. is a more hopeless orphan than even an Army Brigade—note what happened on Dec. 26th. The reason on this occasion was the very good one that 19th Div. Art. was still employed elsewhere; the question was settled by C.R.A. 19th Div. taking over the duty; the step-papa behaved in an absolutely model manner—further, he had a remarkable aptitude for getting things the batteries needed. Altogether 2nd Bde. R.F.A. found 19th Div. and V. Corps (now our masters) very pleasant to serve, which is not invariably the case when strangers are thrust into one another's company.

About this time the Centre Group became once more Right Group, lost this and got that battery, undergoing a hundred-and-one minor modifications to keep one busy. Throughout the period 2nd Bde. R.F.A. and a portion of 155th Bde. R.F.A. remained the Group nucleus.

Other activities of the period were connected with the arrival of Lewis guns for anti-aircraft purposes; anti-tank guns, i.e., guns sited in anticipation of a first-class hostile offensive with tanks, whose chief desiderata were difficulty of detection and a clear field of fire, the final result of which policy proved to be the unnecessary loss of an additional number of guns when the hostile attack came off without tanks on 21st March; attention to reserve positions selected to meet various contingencies; re-entry into the line of "toc-emmas"; employment of a mode of warfare[1] much favoured by C.R.A. 19th Div., but heartily disliked by the infantry, known as "galloping guns," which consisted in the bringing up to the closest range at night of single guns against some predetermined target.

On 26th December 2nd Bde., R.F.A. was relieved.[2] On 27th it moved to a back area. Just as it was leaving, there could be heard behind it (in the forward area) a violent bombardment. According to pre-war teaching, one should have marched to the sound of the guns; but war seemed different from that we had studied, and Bde. Commander shamelessly pursued the brigade way Westwards

[1] Very fine training for the younger officers.

[2] Bde. Cdr. as senior officer present with 6th D.A. had to decline the disagreeable task of deciding whether 2nd or 24th Bde., R.F.A., should be relieved; for the authorities had decided to retain one in the line, and there was no one of sufficient position present to urge a protest; It was 24th Bde's turn for a rest, but their casualties had been negligeable, whereas 2nd Bde. had lost 13 officers and one of its batteries was terribly shattered.

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should like, while on this subject, to recommend two articles in the *Revue d'Artillerie*: "Organisation sans matérial spécial de séances de tir en chambre," and "Le reglage muet ou 'calculé' du tir de l'artillerie." Such study naturally takes for granted that another spirit exists in the Artillery School to that of former days, which Hauptmann Becker describes in "Technik und Wehrmacht," 1921, page 102, as "an antipathy to everything which smelt too much of science."

Part II.

By COL. FREIHERR von WEITERSHAUSEN (retd.),
GERMAN ARMY.

Translated by Lieut. W. L. Gibson, R.G.A.

Although two articles have already appeared on this subject in the *Militär Wochenblatt*, I should like to add a few remarks, as I had many opportunities as a regimental C.O.[1] and C.R.A. of collecting experiences in the offensive. Without under-estimating the valuable suggestions and conclusions arrived at in the first article, I should like in the main to support the ideas of Lieut.-General Rohne. Successful command of the fire of a large number of batteries on an open battlefield in the offensive is not such a simple affair, and no great result will be obtained by searching an enemy zone at the order of the G.O.C. Owing to the ignorance which must exist as to the enemy's division of his forces, and from which, at the commencement of a battle, the G.O.C. usually suffers, so much ammunition would be wasted that its replacement would be impossible. Although we had such wonderful success in 1918 with unobserved fire, one must always remember that this was due to reconnaissances carefully carried out before the offensive. One cannot say that the fire was done without observation, although it was not what one usually understands by observation. By it the effectiveness of the fire was ensured, and even in moving warfare one cannot dispense with effect. The anxiety as to whether one could in the time available find the necessary number of O.P's. is unfounded. Lieut.-General Rohne is right when he says: "First the O.P.—then the battery position." The question of quick discovery of suitable O.P.'s will be more easily solved by attaching groups of artillery to infantry formations. A united artillery advance and command, as we were accustomed to before the war, is no longer possible. In the offensive I made several groups of mixed calibre, from field guns to the 21 cm. mortar, from the batteries at my disposal.

[1] The Divisional Artillery consisted of either 2 regts. of 2 brigades each, 3 batteries in each brigade; or, later on in the war, of one regt. of 3 brigades, each of 3 batteries. One bde. always consisted of field hows., the rest of 77mm. field guns.

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Each infantry regiment was allotted one group which did duty in the regiment's tactical zone. I retained several groups at my own disposal, which were then employed by the division where required. The divisional commander can only give *general* instructions as to the target for the artillery, its order in battle and the ammunition to be expended, the rest is the artillery commander's job. The artillery attached to the infantry naturally has its liaison officer, and the F.O.O. must of course be with the most advanced infantry detachment. Consequently the artillery will be just as well informed as to the movements of the enemy as each infantry commander. Thus a basis is given for a practical control, although in some cases every shot will not be able to be observed; but instead the shelling of a given area can be carried out.

The first order of the C.R.A. for the reserve groups was as a rule given by the map and under instructions from the division. This however, did not absolve the batteries concerned from the duty of providing means for observing fire by F.O.O.'s who should, as soon as possible, make liaison with the infantry. I never encountered any insurmountable difficulties in doing this.

In the offensive the chief tasks are to cover the roads and villages in the area in which it is presumed that the enemy advance will take place with fire, and to engage the enemy infantry with *all* the artillery at one's disposal. If the enemy artillery is in covered positions, it cannot be engaged at first. Not until the further development of the battle will it be possible, by air or suitable ground observation, to bring effective fire to bear on enemy batteries which have been unmasked. It would be a criminal waste of ammunition to attempt an indiscriminate searching of the ground to neutralise enemy batteries whose postions were unfixed. Observation of individual rounds is unnecessary if weather conditions are taken into consideration. Concentrated fire must be the rule. Only in the case of targets moving forwards, backwards or sideways is the observation of individual rounds of value for ranging purposes. At first sight it might appear that, by the separation of the various groups, a frittering away of the weight of the artillery results. This is avoided by the powers of the C.R.A., who is allowed, according to the situation, to collect groups together and employ them where required.

To connect up the O.P.'s and the batteries and brigades quickly an expert signal service is required, and only special signal sections attached to staffs and batteries can do the work, as I have repeatedly pointed out in my former articles. The calculation of the amount of ammunition required must be left to the C.R.A. as a knowledge of the capabilities of the various calibres is necessary.

An accurately working creeping barrage cannot be carried out by the whole divisional artillery in the offensive; but the groups working with the infantry can considerably lighten the advance of the latter by frequent "lifts." As regimental commander I have often done this. The C.R.A.'s job is then to control the fire of the other groups. Even in the offensive one can employ gas-shell as well as H.E., and this can be done without damage to one's own infantry.

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In the question as to whether one should use shrapnel or H.E. I cannot agree with Lieut.-General Rohne. Shrapnel is doubtless a good projectile, but in its serviceability for war purposes considerably inferior to H.E. This comes from the difficulty of regulating the time of burning. This is dependent in the first case on the quality of the work in the manufacture of the fuze, and secondly on the training of the battery commander; in a long war both factors deteriorate considerably, and as experience has shown, the war value of shrapnel is greatly influenced by them. Even in peace I discovered that many battery commanders could not master the process of shrapnel fire. In peace one will certainly get better results per cent. on *targets* with shrapnel than with H.E., but against thickly armoured and protected targets, as found in war, the result will certainly be different. Against these the H.E. shell has an incomparably greater effect than shrapnel with its small penetrating power. The moral effect of bursting H.E. is, according to all war experiences, much greater than that of shrapnel, with its almost noiseless burst and resulting negligible damage.

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A FIELD ARTILLERY GROUP IN THE SURPRISE.

By COLONEL W. H. F. WEBER, C.M.G., D.S.O., R.A.

CHAPTER I. PRELIMINARY; MORAL.

The late Autumn of 1917 found several divisions of the British Army on the Western front very happy, for they had escaped from the Passchendaele ordeal. Some were on the way to Italy, where things might be better and could scarcely be worse, and which in any case held novelties and romance for such as cared for it. Amongst the happy ones was the old 6th Division, pulled out from months of trench warfare about Lens for their turn at what the Army called the "blood-bath," but whom a lucky turn of fate had headed away on a mysterious errand down South.

The 6th Division, as one of the units of the Expeditionary Force, would, one had thought, have participated in the earliest fighting. However, fear of invasion kept it intact at home for some time, so that it missed the 1914 Retreat—there was a 1918 Retreat, too. It was on the Aisne, but received only the outskirts of the storm called by us the First Battle of Ypres; it missed all but the aftermath of the Second Battle of Ypres. To a long period of trench warfare in "the Salient" had followed a turn on the Somme, where it had the misfortune to meet an enemy strong point, named the Quadrilateral, not far from the notorious village of Guillemont. That encounter explained a considerable change in the personnel of the division, but there followed more trench warfare in the Spring and Summer of 1917, so that considering its antiquity the 6th Division may perhaps have possessed a more marked pre-war flavour than any other in the army, its time on the Somme having been its principal experience of the really bloody battle.

Even now, at Cambrai, it was to find itself at the point of a (new) salient, while enemy hordes chose, in accordance with principle, to batter at the re-entrants; the debacle on its right would not suffice seriously to implicate the division, while the furious German attack on its left rear about Bourlon would scarcely at all affect it.

The 6th Divisional Artillery shared in this emission of a pre-war aroma, which could be detected by any experienced artilleryman in either its wagon-lines or its gun-pits, and gave outward and visible signs of its existence at the I Army horse-show in May '17. Such a condition undoubtedly presents more advantages than disadvantages, but there were certain units which had not yet undergone that great metamorphosis which *must* come some day in a long war—comparable to the change which comes over a family when the elder generation is laid to rest.

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Within one year, approximately, the effects of battle were to be experienced to the full—in the course of which another Quadrilateral was to figure; the armistice would find this divisional artillery, perhaps not less efficient—for what is lost through casualties may be gained through experience—but profoundly changed in character. In this process, events at the Battle of Cambrai played a very important part—at any rate as far as 2nd Brigade R.F.A. was concerned; and they gave, not only to that unit, but to all present, an invaluable fore-taste of what was to come in 1918; for by November, 1917, the demon of trench warfare had us fairly by the throat, and control from behind was at its height; more than this, we had since July, 1916, been imposing *our* will on the enemy.

CHAPTER II. THE APPROACH.

In the last days of October, 1917, 2nd Brigade R.F.A was "in rest" near Aire. The Bde. Commander was engaged (i) in the study of numerous memoranda concerning the nature of the Flanders fighting, and (ii) organising a rough practice camp where the guns of the 6th Divisional Artillery could be calibrated in the old-fashioned way. These preparations were suddenly cut short by an order to march on the morrow—not North, but South; there followed some pleasant days. We had no idea what was to be our fate or destination; the Caporetto debacle had recently been announced and it was known that several divisions were for Italy, but we were surely marching in the wrong direction for entrainment? As the march went on, and other movements were noticed besides ours, it was permissible to guess in the manner of Bairnsfather's "Old Bill" that a "blinkin' offensive was coming off"—but where, and how?

Eventually we halted not far from Albert, headquarters of III Army, in an area where houses still partly existed, and in the course of a few days some of us learned that we were to participate in a Surprise—with the assistance of many tanks and a large force of cavalry; that secrecy was all-important; that great hopes were entertained of the operation, the result of which nobody could foretell; and that 6th Division was to be one of those forming the spear-head of the attack. Further, we learned that the barrage was to be unregistered, fired from guns to be calibrated in the back area by a new method. Of course the minimum of impedimenta was to be kept with the troops. We had indeed progressed if all this really came off! For the struggle for the Passchendaele Ridge was still going on and the enemy's attention would be held by this and his eyes fixed on those parts or on Northern Italy.

The new method of calibration, to ascertain the so-called muzzle-velocity (M.V.) of each piece, interested all ranks of the artillery, whatever may have been their doubts as to its efficacy. The elimination of "registering," as well as of the preliminary bombardment, must undoubtedly wipe out one of the great obstacles to Surprise, which the whole army had long since realised as essential to success, but which it had not been within a long distance of achieving to its

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satisfaction; the men had never understood why we should keep hammering at the same place after the enemy was once thoroughly prepared, as we had done on the Somme and at Arras and were still doing in Flanders. Somewhere in Ludendorff's book occurs the remark that the Germans imitated in March, 1918—without tanks, of course—what we had done at Cambrai; but at the time of the assembly of troops for this Surprise, one was told that we were imitating what the Austro-German army had done on the Caporetto; to borrow a phrase from the old F.S.R., Part I, the "best type of war is a methodical progression from idea to idea." Then, too, the notion of using tanks *en masse* was not new to the junior ranks, and everyone was keen to see it tried in practice. The massing of cavalry to exploit success was assuredly no new phenomenon—but we hoped that this time they would get their chance (in return for drinking up the water). Lastly, we were to abandon to a certain degree the theory of the limited objective, conceived at Neuve Chapelle, born at Loos, and now grown to full manhood in Flanders.

After seeing some calibration, the Bde. Commander went "on urgent private affairs" to Paris,[1] whence he returned to find 2nd Bde, R.F.A., bivouacked in Manancourt Wood, endeavouring to dry itself after the wettest night march on record.

Here may be mentioned the means adopted to conceal the concentration from the enemy:—

(i) No troop movements by day.
(ii) Working parties at night only; all work camouflaged before dawn.
(iii) All troops accommodated in woods; no fresh wood on fires after entering stables (but lights allowed inside tents or shelters); exercise and watering-orders along the fringes of woods.
(iv) Every unit maintained an aeroplane sentry by day.
(v) No names mentioned on telephones; new wires forward of a certain line not to be used before zero.
(vi) No guns on new positions till latest moment possible.
(vii) A quiescent attitude on part of troops holding the line.

At first only battery-commanders were informed as to the positions, which were not taken over by them till 14th; these positions had been chosen by the troops occupying the line, and ammunition (by this time very wet) dumped thereon; they had been allotted numbers and were invariably spoken of by those numbers.

[1] Where, besides seeing M. Sacha Guitry in "L'Illusioniste," he enjoyed some most pretty eating; our French friends may not have approved of the gaiety prevalent in England, but they certainly did not cut the quality of their cuisine! The return journey was indicative of the times; rail to Amiens, motor-jump to Corbie, lorry-jump to Peronne, whence, not being able to find floor-space in the "officers' rest-house" established by the B.E.F. Canteen in a ruin, the writer was rescued by an American officer, to enjoy the hospitality of some newly-arrived American Engineers. It is true that he did not get many hours rest in that most pleasant company, but, when conducted by "scooter" next morning along the light railway from Epehy to Fins, he was no emptier for his house had been full. Thence by a luxurious limousine, which cercertainly never expected such vile treatment, to Equancourt, and from there on his trusty steed to his poor wet brigade, where there was as yet no home.

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There was a considerable amount of work to be done on the positions *before* zero, in the shape of approaches, preparation of headquarters, floor-emplacements (guns were to be sunk axle-deep at most), trail logs or fascines, collection of material for work after zero. Obviously some positions, being less exposed, could be better prepared than others. There were also signal communications to be laid (after the system of command had been decided), observation to be arranged, a visual scheme prepared, alternative positions and routes for advance reconnoitred, ammunition supply, moves of wagon-lines treatment of casualties, etc., to arrange. In addition, it was essential that officers should know their way about our lines and study the lie of the land in enemy territory; when one remembers that we were all strangers in the district, and that movement by daylight was forbidden, it will be understood that the hours of darkness or semi-darkness were "periods of increased activity."

On the 17th, it was possible to announce the composition of the Right Group under O.C. 2nd Bde. R.F.A.—which as usual meant the splitting up of the Brigade Staff; the location of bridges over our trench system was notified—we were advised to follow tank routes in advance over the enemy system. On that day also, infantry of 6th Divn. took over defence of the line, while C.R.A. 6th Divn. was to assume responsibility at 17.00 hours on 18th. He appointed his F.A. Bde. Commanders as his deputies for that purpose. Arrangements must forthwith be made for the artillery defence, for which the Right Group Commander used two Batteries from outside 2nd Bde. R.F.A. and gave out the necessary S.O.S. Lines and arranged defensive concentrations, liaison, registration by the two selected batteries (by single rounds), and communications to a certain (formerly battalion) headquarters in the Villiers Pluich—Beaucamp road. This defensive responsibility entailed the O.C. 2nd Bde. R.F.A. leaving his batteries under the senior battery commander, the brigade thenceforth forming a sub-group. The barrage maps and special instructions had not yet been issued when the Bde. (now Right Group) Commander went up to the line on the afternoon of 18th

A set of instructions was issued by the 6th D.A. late on 17th shewing the final signal and ammunition-supply arrangements. The instructions dealt with certain other points as follows:—

(a) Trench Mortars; task ceases zero + 5′; personnel to man any captured guns.
(b) Preparation by R.E. and Pioneers of forward roads and pack tracks, the other side of our trench system; our artillery told not to use H.E. against any known roads on our line of advance.
(c) Warning against possible booby-traps in enemy trenches; this was hardly necessary, but the lessons of the enemy withdrawal in the Spring were not yet forgotten.
(d) Complete list of Report Centres (selves and neighbours).
(e) S.O.S. Signals of various Corps and the Cavalry.

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(f) Aeroplanes to give special signals warning us of enemy counter-attacks.

(g) Water-supply—units to carry biscuit tins.

(h) Certain instructions *re* care of our own pieces, and information as to Mobile Workshops, 1.O.M's., etc.

The above-mentioned signal instructions demanded considerable amplification as to details within the Right Group; personnel had to be found from the batteries for orderly-work, visual stations, transmitting stations, sub-exchanges, and in particular a Forward Communication Party (from which great things were expected); there was wireless this time—not to be used for messages "in clear," of course; a special iron ration issue of cable was given out; operation messages were to be sent, if possible, by orderly. All this was seen to and settled on 18th. No doubt great demands were made on the signallers, though such things do sometimes read more alarming than they really are.

His written Operation Order was not issued by the Right Group Commander until the last possible moment on 19th. It announced the extent of the initial attack from Banteux to Havrincourt, and the flanks of the 6th Div. (Villers—Marcoing railway and a trench called Coalville Lane); gave the enemy opposite us as 27th R.I.R. of 54th *Saxon* Division; 6th Div. to attack with 16th I.B. on right and 71st I.B. on left—18th I.B. in reserve, to advance through 71st I.B.; 29th Div behind 6th Div., and cavalry behind that; 16th I.B. to attack with 2/Y. & L. R. on right and 8/Beds. on left; Right Group supporting 16th I.B. to consist of 2nd, 17th, and 181st Brigades R.F.A.; Field Artillery task involved bombardment of a series of lines —not quite the usual "creeper"—and the use of a deal of smoke; Tanks to assemble behind our trench system and start at zero minus 10; 17th Bde. R.F.A. would be the first to advance; zone calls to be answered by 181st Bde. R.F.A. The contents of this order were to be communicated to the men after dark on night Y/Z (19/20). There were the usual number of special instructions for certain batteries outside the normal tasks as given on the barrage map. Curious to relate, it was only necessary to make one serious amendment after the very last orders had been issued. Thus we became ready to Surprise. See Position 1 on map.

Comments.—Military records and descriptions of war, unless intended for the front page of a popular journal, seldom bring to the reader's understanding such things as the conditions of life of the participants; even moral, though pronounced on all sides the most potent factor, generally receives only academic notice. It is as if we hear at the club that X. "has lost a fish"—interesting to Y., sometimes, perhaps, not unpleasing to Z.—but not disclosing in any way the thrill that X. got when the fish caught hold, the excitement of a few minutes' play blotting out the rest of his world, and his passionate disappointment at the loss.

In the days preceding the assault there was a genuine excitement amongst the men, very different from the anxious foreboding usually

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experienced. *All ranks played up for secrecy*—and attained it, aided of course by the cloudy weather which impeded activity in the air, but *aided still more by the passive attitude of the enemy* opposite us. It is true that at the last moment he captured a man or two from one of the newly arrived British divisions, but fortunately too late to prevent the Break, whatever the results may have been as to summoning of reserves. (Of British reserves there were unluckily all too few, but the writer does not intend here to enlarge the scope of his comments on that point.)

The controlling powers justly endeavoured to decide the minutest details up to zero hour; of course there were bound to be more than the usual number of "ifs," for it was a gamble on massed tanks and Cavalry, comparable to the German gamble on gas in April, 1915. How control was practised after the troops had effected the Break, and what happened to it when the enemy in his turn achieved Surprise, can be gathered to a degree from the ensuing chapters; but some, at any rate, of the controllers crossed the Rhine a full year before their fellows.

The troops used to trench warfare conditions undoubtedly found very trying such things as the rather haphazard arrival of materials, bad storage of ammunition, lack of registration, absence of billets, etc.; in 1918 they were used to all this, but we had not got so far.

An interesting point was the arrival of the tanks by train, their assembly in the woods, and their advance to the line of departure (better known as the "jumping-off place") under what noisy cover a few guns could provide.

Another thing to notice is the relief of troops holding the line prior to a surprise. The sooner it is done, the emptier becomes the area and the better the new troops become acquainted with the country; but, on the other hand, the later it is done, the less chance of capture of individuals from the recently arrived formations; and perhaps this last argument is the most important. The French attack in Champagne in 1917 and the German attack about Rheims on 15th July, 1918, were both vitally affected by the capture of a few men from the attacker's forward troops. Anything which can be done to prevent such a mishap seems permissible, even to an unblushing bolt. The conditions in which the prospective assailant finds himself just prior to the attack afford the enemy a grand opportunity for counter-action, if the latter has but time to arrange such: it is unlikely that that enemy will attack on a large scale—if he did, he would find numerical superiority against him; but he can without insuperable difficulty make a partial offensive on a very limited objective such as seriously to disorganize the attack—vide the German action near the mouth of the Yser in the Summer of 1917; or he can retire as the French did on 14th July, 1918, and the Germans did (on a strategic scale) in the Spring of 1917; in either case he can plaster the attacker's assembly with H.E., or perhaps even better in some circumstances with gas. We are anyhow led to the conclusion that if (as the text-books say) the defender, while hanging on with his teeth and nails, must think

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of the counter-attack, the attacker can never dare take his eyes off the defence—and there is no earthly reason why the offensive should be the less resolute for that.

* * * * * * * *

In peace time anyone would have described the scene of these operations as an ideal battlefield. Perhaps there were not so many trenches as usual, but the wire and such trenches as there were made great obstacles for cavalry. The principles features of the battlefield at large were :—

(i) Flesquieres, a village on a hill, without capturing which the attack could not continue; it was held by us still to the last moment in March, 1918.

(ii) Bourlon Wood, a point d'appui of the first importance on the N.W. flank of the new salient; tanks and H.E. put our infantry into it, and gas drove them out; it possessed two outposts, which were always changing hands—the villages of Bourlon and Fontaine Notre Dame.

(iii) The Canal de l'Escaut, which was held responsible for the failure of the cavalry exploitation, but which was crossed by a Canadian mounted detachment.

(iv) The villages of Gouzeaucourt, Gonnelieu, and Villers Guislain, pivots of the give-and-take struggle on the S.E. flank of the new salient.

(v) The towers and spires of Cambrai visible to the N.E.

Of special importance to the 6th Division were :—

(a) The Grand Ravin which was followed by the Havrincourt—Ribecourt—Marcoing road, a concealed avenue, fairly narrow but unenclosed;

(b) The cleft, along which ran the roads and railway from Villers Pluich to Marcoing, and which acted as a natural flank to the 6th Divisional area;

(c) The high ground about La Vacquerie, whence the enemy could easily observe our concentration if carried on in daylight, and our advance if he were not himself attacked;

(d) The little country town of Marcoing, and the village of Ribecourt, an important road junction;

(e) Nine Wood, or Bois de Neuf, lying on high ground, in peace time no doubt of importance from the point of view of "chasse," but during these times the observation centre of the whole area.

As usual, the villages had, from a distance, the appearance of woods; except along the main roads where there were the usual poplars, there was not a tree to be seen outside woods or villages, the whole area having been intensively cultivated.

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CHAPTER III. THE BREAK. (NOVEMBER 20/21).

20th. Zero hour (06.20 hrs.) arrived—"Time and Tide they wait for No Man, No Man, No Man." Surprise was achieved.

Without waiting for precise information as to events on the flanks, Brigadier 16th I.B. went forward soon after 10.00 hrs., accompanied by Right Group Commander. There was a hasty visit to the four battalion commanders, all in great heart, to get news; the only fire came from a single 77 mm. gun, obviously at quite close range, and probably one of those captured later N.E. of Flesquieres.

Group Commander then went forward, nearly to Marcoing, and at 12.00 hrs. sent a message to 6th D.A. to the effect that our infantry, probably the 29th Divn., were ascending the slopes beyond the Grand Ravin on their Way to Nine Wood; he could give no information as to events on the right except that the cavalry were advancing, but on the left it appeared that we were not yet established in Flesquieres; the before-mentioned 77 mm. gun had ceased rather before this to annoy us. Returning at 12.15 hrs. he met the first battery of 16th Bde. R.H.A. (29th Div. Art.) advancing; he requested permission to advance 2nd Bde. R.F.A. and sent for its battery commanders. The weather had taken a turn for the worse and it was now very wet.

B.C's. 2nd Bde. R.F.A. duly arrived for a reconnaissance, but brought word that the Bde. was to be prepared to join the cavalry "N.E. of Cambrai"; also that 21st and 42nd batteries had been told to advance alongside 53rd (most advanced) battery, which lay N. of Villers Pluich—Beaucamp road. Later he received instructions that 2nd Bde R.F.A. was *not* to advance, so he returned to Bde. Hdqtrs., leaving the Forward Communication Party with 16th I.B. Staff. On arrival at his signal office he found a message that 2nd Bde. might now advance, but it was by this time nearly dark; so he decided to concentrate the Bde. on its gun positions, ready for whatever the next situation demanded; there was some confusion owing to the fact that battery wagon-lines had moved by order of superior authority unknown to battery commanders (3)[1]

Orders issued on the evening of 20th gave the situation as follows: 29th Div. in front line, 6th Div. in support; 2nd Bde. R.F.A might have to move with cavalry or its own infantry; much depended on course of events about Flesquieres; readiness to move at dawn, B.C's. accompanied by battery staffs. Right Group had ceased to exist as such, for 17th Bde., R.F.A., had joined 29th Div., and 181st Bde., R.F.A. (its own) 40th Div.

21st. A reconnaissance was made at daylight, in the course of which we learned that Flesquieres was now in British possession; no further orders were received. 6th D.A. Hdqtrs. arrived later to take over (former Right) Group Hdqtrs. accommodation; it was therefore obvious that 2nd Bde., R.F.A. must advance, and a move was made

[1] See 'Comments' at end of Chapter.

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at 10.00 hrs., B.C's parties in front, through Ribecourt. A temporary position (No. 2 on map) was occupied (near the Hindenburg Support Line) about L 20 d.

Bde. Commander then went forward and visited 86th I.B. (29th Div.) and 16th Bde., R.H.A., in Marcoing, where one had found any amount of enemy material, food, trophies, etc.[1] Hearing there that Noyelles was securely in our hands, Bde. Commander advanced 21st and 87th batteries some hundreds of yards, to shorten the range (Position 3 on map); he then visited Nine Wood whence a fine view of the country could be obtained. While there news reached him that Cantaing had been captured by our neighbours. Accommodation for Bde. Hdqtrs. was fixed up in Marcoing, and wagon-lines were ordered forward and later established in or about the village of Ribecourt (3).[2] During the afternoon, while Bde. Commander was at Nine Wood, battery commanders were reconnoitring the forward area in view of the almost certain order to advance. Dispositions were reported to 6th D.A., and were approved, with an important *rider to the effect that it would be advisable to get closer up.*

2nd Bde. R.F.A. Operation Order that night announced that 16th I.B. (6th Div.) was relieving 86th I.B. (29th Div.) forthwith; that 16th Bde. R.H.A. would be relieved of responsibility for support of (the new) 6th Div. frontage at 09.00 hrs. on 22nd; gave S.O.S. lines for night 21/22 to all batteries; ordered 21st and 53rd batteries to advance at 05.00 hrs. on the morrow (22nd) to L 16 d 2/0 and L 22 a 5/3 respectively, and to complete registration from those positions by 09.00 hrs.; 42nd and 87th batteries to advance, 42nd to near 53rd battery, and 87th to certain quarries immediately W. of Nine Wood, as soon as the 21st and 53rd had "shot themselves in"; located 2nd Bde. Hdqtrs. at L 22 a 9/1.

Comments on Chapter III.

(1) The sad part of this chapter is its brevity. By the evening of 21st all chance of break-through was over; if the advance was to continue, it must be by renewed attacks without the advantage of surprise. The question is, at what moment could the cavalry have been effective? May be there was still a chance on 21st, if the Canal de l'Escaut could be crossed—it *was* crossed by a Canadian mounted detachment on 20th, some of whom are alleged to have penetrated into Cambrai (where they were rounded up), the rest returning the way they came after an exciting ride and an efficient performance. Public opinion on the spot inclined to the view that their best chance of far-reaching success was on the afternoon of 20th; if this was so the cause of failure was the delay before Flesquieres, for which ample troops were available on either flank but were not used;[3] the tanks

[1] The notepaper found was not yet exhausted when the Germans endeavoured to recapture it on 21st March, 1918. In addition there was some very sour Rhine-wine, and an officer's clothing store with a wealth of decorative hats for souvenirs.

[2] See 'Comments' at end of Chapter.

[3] Camp gossip had it that "amour propre" caused certain officers to refuse the offers of help pressed on them by their neighbours.

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accompanying the troops responsible for the capture of Flesquieres were held up by, and suffered heavy casualties from, German field-batteries (in the open) E. of, and quite close to, the village. This was probably the best opportunity that cavalry had had since the opening of position warfare; but it was missed, if indeed it ever existed; a barber in Rhineland told the writer that he was at that time observing for a German heavy battery, and that, when the German field-guns near Flesquieres were put out of action, there was no one between him and the British and no German infantry that he knew of within miles. With that one must consider the measure of success attained by the above-mentioned Canadian detachment. The writer has never heard what exactly were the orders given to our cavalry for the whole operation; no doubt they will one day be published, but, whatever they were, the chance for effective action was gone by the evening of 21st.

(2) The great attack of tanks *en masse* had been tried, and very successful it was—and gave an important line as to future handling of tanks, which eventually produced, or much assisted to produce, a decision on the Western front; many people were of the opinion that tanks should never have appeared on the battlefield until they could be used as they were at Cambrai—but iet that be. At the time we field-gunners thought that our barrage was redundant and that it even *interfered with the Tanks*, but of course one must consider it as a second string in the way of protection to our infantry—i.e., should the tank enterprise have failed; this is not to say that the field artillery use of smoke was anything but valuable; it is probably an essential to a tank assault, and tanks may in future produce smoke for themselves, like a warship. That tanks can be held up, in limited number, if the moral of the defenders is sufficiently high, is shown by the disaster which befell so many of them at the hands of a few German field-guns (and howitzers) at some hundreds of yards range E. of Flesquieres; it was said[1] that a German artillery-officer continued personally to handle the last of these guns up to the moment when he was shot by the British infantry advancing across the Grand Ravin; the writer is unable to verify the story in detail, but something of the kind no doubt occurred, and we must render this officer the homage due to his gallantry—and can learn something for ourselves from his action; the tank cemetery was optically obvious to those who advanced through Ribecourt on 21st.

(3) Some points in connection with "wagon-lines" seem worth notice. The shifting of battery wagon-lines unbeknownst to the battery commander is not only administratively inconvenient, but can easily lead to serious inefficiency at a critical moment; it should not occur. The question as to who should originate the order to shift wagon-lines during an advance, whether D.A., the Group Commander, or the battery commander, was raised in another paper,[2] but in any

[1] The incident is, in fact, mentioned in Sir Douglas Haig's despatches.

[2] "A Field Artillery group in the General Advance."

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case the battery commander must be warned of the order to move. A very old mistake was made on 21st, the lure of houses (or rather ruins) proving once again irresistible; Ribecourt was an important road-centre and a certain target; needless to say we suffered for our temerity, for, as early as the night 21/22, 87th battery wagon-lines were badly shelled; of course at the moment further advance was expected, but————

(4) An impression was prevalent in the forward area that, at the end of a long period of trench warfare, subordinate commanders were more ready to assume control than the controllers were to give it up; that may be a one-sided view. On the other hand it became obvious at this quite early phase of the war of movement that many individuals amongst the subordinate commanders did not shine with the brilliance expected of them from the experience of the past years, for trench warfare had habituated them to slow decisions, if not to the habit of waiting for orders.

CHAPTER IV. THE HOLD-UP (November 22/29).

22nd. The moves as ordered duly took place; batteries registered, and the usual communication, S.O.S. duties, and liaison, etc., were arranged. Position 4 on map. 2nd Bde. O.O. issued that evening announced that 16th I.B. (which 2nd Bde. was still supporting) was to consolidate its position, the left battalion swinging up somewhat to meet the neighbouring troops near Cantaing. But at 17.45 hrs. a message was received from D.A. saying that "6th Div. was to form a defensive flank"—apparently in view of intended attack by our neighbours from Cantaing on the morrow (but there is no copy of this message amongst the writer's records)—and that "all batteries were to withdraw to the neighbourhood of the Hindenburg Support Line."

The only other incidents worth mentioning this day were the severe shelling[1] of 42nd battery wagon-lines and a direct hit[1] during night 22/23 on the house in Marcoing occupied by 2nd Bde. headquarters.

23rd November was a very busy and decidedly unfortunate day. A reconnaissance for new positions in accordance with last night's message was made betimes. 51st Div., now on our left, attacked Fontaine Notre Dame with tanks; the tanks got beyond the village, but the attack was unsuccessful—probably due to m.g. fire from La Folie woods, which 2nd Bde. R.F.A. was engaged in shelling vigourously throughout the day. This attack produced heavy hostile fire all over our area, and some gas in Marcoing; 42nd battery suffered severely, losing 3 officers, 5 sergeants, and several others, on its new

[1] A young officer from The Shop, applied for by Bde. Cdr., reached his battery wagon-lines to be thus welcomed; he was in the room which received the direct hit that night; at his battery gun-position during the bad time next day; he was sleeping under a wagon between his B.C. and senior subaltern on the night 30 Nov./1 Dec., when one was killed and the other wounded; and was himself severely hit on observation in Nine Wood on 3/Dec.—Such is the fortune of war!

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position (1);[1] another officer was hit on liaison in Nine Wood, and 2nd Bde. Signal Officer severely wounded outside Bde. hdqtrs.; 87th (How.) battery had casualties in the quarries W. of Nine Wood. Batteries had to withdraw piecemeal, at dusk to their new position (No. 5 on map), while maintaining our defensive responsibilities; it had been promised us that during their withdrawal other R.F.A. units should cover our zone, but the units concerned appear never to have received the order to do so (2). At the same time all wagon-lines, tired of the attention they were receiving from the enemy at Ribecourt, were withdrawn to the neighbourhood of Villers Pluich, which proved later to be an abode of anything but rest. The 4 batteries had now, between them, occupied 16 gun-positions since they left their zero hour points.

On this day it was notified that Bourlon Wood was in British possession.

24th. On 24th, 16th I.B. and 2nd Bde. R.F.A. hdqtrs. moved out together to dug-outs at L 21 a 5/5. A considerable amount of reconnaissance was carried out, night sniping arranged, and other normal trench warfare conditions resumed.

25th. Orders were issued for support of a serious attack by 29th Div. on our right, but this attack did not take place.

It was announced that the line to be consolidated by III Corps ran, high ground in G 21 a — Lock in G 17 d — L 11 c — L 10 b — L 4b 0/5, with posts well in front; it will be seen that the line of resistance ran round Nine Wood. The dividing line between 28th and 6th Divs. ran L 17 c 0/2 — Grand Ravin to L 21 d 8/2 — L 32 c 8/0 — R 7 d 1/0.

Bde. Commainder gave priority of battery work as (i) accommodation for personnel, (ii) protection of ammunition, (iii) protection of guns; one must remember it was now winter. The dump to be maintained was fixed at 252 r.p.g. 18-pr. and 204 r.p.g. 4·5″. 24th Bde. R.F.A. on our left, was crossing its fire with 2nd Bde., because of the shape of the ground, and protected right battalion 16th I.B. Two heavy-artillery groups were within call.

Guards Div. was now on our Northern (left) flank, and at 14.00 hrs. a Guards officer told Bde Commander that we held Bourlon village except for a few (surrounded) enemy posts. The Guards' line met 6th Div. about L 4 central.

26th/29th. A readjustment was now ordered, to take place night 26/27. 6th Div. would put two I.B's. in the Line; 71st I.B. (in relief of 16th I.B.) on right, supported by a Right Group consisting of 2nd Bde. R.F.A. and 112th battery of 24th Bde. R.F.A.; 18th I.B. (in relief of 1st Guards I.B.) on left, supported by a Left Group consisting of 24th Bde. R.F.A. (less 112th battery) and (on 29th November) 277th Army Bde. R.F.A.

Up to the evening of 29th, the daily, and almost all-daily, offensive task of Right Group was the shelling of La Folie Woods in support of efforts by the Guards to capture the village of Fontaine

[1] See 'Comments' at end of Chapter.

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Notre Dame, an important outpost to Bourlon Wood, the still more important pivot of operations in these parts. The Guards' endeavours did not meet with great success; Fontaine Notre Dame was never long held by us, and Bourlon village was constantly changing hands. Our defensive task was the consolidation of our position at the apex of the new salient, in which the most difficult item to secure was a properly protected O.P. in Nine Wood (3), which was to us what Bourlon Wood was to our neighbours—only that the advanced posts (Cantaing, Noyelles, and Marcoing) were firmly enough established in our possession.

Comments on Chapter IV.

(1) It is difficult to know why 42nd Battery came under such heavy fire on 23rd; whether it was seen occupying its position, or whether its flashes were visible from some enemy O.P.; personally, the writer believes this fire was in the nature of counter-preparation—directed on an area, rather than on a target. Whatever may have been the cause, the trouble of 23rd was the beginning of the great metamorphosis for this battery; it had but a few days previously got a new captain; almost at this moment its quite excellent B.S.M. had to go sick; at Marcoing on 23rd it lost 3 subalterns and 5 sergeants—but worse was to come! Events at the battle of Cambrai completely changed the character of the battery, which never again showed its marked pre-war flavour.

(2) The nature of the war of movement had been so forgotten that necessity for strict compliance with an operation order or message was scarcely realised. For instance, on the evening of 23rd the necessary withdrawal of batteries had been most carefully timed so as to maintain possibility of support of the line—a highly important consideration at that moment. Batteries wished to move at the moment most convenient to themselves—all at the same time. We all know there are occasions when a subordinate thinks it best to act otherwise than in accordance with orders, and we know the conditions under which disobedience may be justified; but the last word on the question is that *by disobeying, one lets one's neighbours down.* This is rather harsh criticism; indeed any failure there was, was very likely due to some manner in which the orders were given—i.e., the fault of the orderer rather than the ordered; the matter is mentioned only to lead up to the thesis that in no point was the battle of Cambrai more important than in reminding troops, highly trained before the war to mobility, of the elementary conditions connected with the war of movement.

(3) One may compare our difficulty in employing to the utmost the excellent facilities for observation from Nine Wood to the difficulties doubtless felt by the Germans in using Mount Kemmel during the Summer of 1918.

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CHAPTER V. THE COUNTER-ATTACK (Nov. 30-Dec. 6).

30th Nov. Early on the morning of 30th there was heavy firing to the right (South), and a considerable amount of "stuff" fell in the Grand Ravin. After a short time one could see from Group headquarters (in L 21 a) masses of Germans advancing over the heights S. of Masnieres and our own infantry retiring. Later, there was obviously heavy fighting in progress in the direction of Bourlon (the left rear) also.

The enemy had, in his turn, achieved Surprise—Sir Douglas Haig calls it "local surprise." As usual, a number of people had expected attack; many people temperamentally expect hostile action; but in this case it would appear that subordinate commanders had definitely warned the authorities that counter-attack was imminent.

Reports of an alarming nature (capture of Gouzeaucourt!!) arrived from the right, and gradually also from behind, but on 6th Div. front it was quiet. Nevertheless, with the concurrence of Brigadier 71st I.B., Group Commander ordered the batteries in the Grand Ravin to withdraw by sections to L 19 d on the slopes N. of Ribecourt and to L 2 6 d on slopes E.S.E. of that village, his principal object being to get direct observation on the enemy, should they continue to advance; additional reasons were (i) the fact that the Grand Ravin was a sure target, (ii) facilities for getting away without traversing Ribecourt. These orders were obeyed by 21st, 53rd, and 87th batteries, but appear to have been misunderstood by 42nd; 112th battery sent 3 guns to L 32 central (W. of Bois Couillet ravine), maintaining the remainder at L 27 d 9/2 on E. slopes thereof; ammunition supply on the new positions was by "echelon" vehicles. Any surplus kit was returned to wagon-lines, which, coming under heavy fire (of course) at Villers Pluich, all moved to Havrincourt Wood.

Towards evening the situation seemed to be stabilised—we heard Gouzeaucourt had been recaptured by the Guards; the defence of our line having to be considered, Group Commander decided to move back to original positions; 21st battery did this, and 87th Hows. (only part of which had, for special reasons connected with the defence of the line, moved); before 53rd could comply, an order came from 6th D.A. that batteries were not to go forward again, so 53rd remained where it was, well placed for eventualities on either side of the Grand Ravin near Ribecourt; 112th battery also maintained its split position. See Position 6 on map.

By midnight communications were thoroughly re-established and ammunition supply seen to, but 42nd battery had lost yet another subaltern wounded.

Owing to the fact that its reports of this period went through the normal channel (O.C. 24th Bde., R.F.A.), no accurate description, unfortunately, can be given of the experiences during period 30th Nov./3 Dec. of 112th battery, commanded by Major W. S. Ironside, D.S.O., M.C., an officer who had landed with 6th Div. in France as a sergeant, and who was killed in command of 112th battery on 2nd

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Nov., 1918, near Le Cateau, to the intense regret of the whole division. This battery had enemy infantry within a few hundred yards at one time, it is believed, and on several occasions engaged infantry targets over open sights. As chance would have it, the telephone line from Group Hdqtrs. to 112th never "went dis" and the battery commander continued to discuss the situation through this exciting time with his usual unruffled equanimity. (The writer had believed that an account of 112th battery doings appeared in one of the early numbers of "The Gunner"[1] under a series of articles entitled "Some Episodes during battle-fighting on the Western Front (communicated by Major-General H. C. C. Uniacke, C.B., C.M.G.).

Night 30th Nov./1st Dec. At 01.00 hours on 1st Dec., an enemy shell landed on the wagon under which were sleeping the battery commander and two of the remaining subalterns of 42nd battery. The battery commander was killed and his senior subaltern severely wounded; 42nd battery was now left officered by a newly arrived captain and two, both recently joined, subalterns; it was suffering a perfect holocaust.

The death of Major N. B. Robertson, D.S.O., was one which the Regiment could ill-afford; he was the very type of a 1914 battery commander. For 42nd battery it spelled disaster; the 42nd battery *was* Major Robertson. Everything has the defect of its qualities and the qualities of its defects; the disadvantage of such personality lies in the fact that an awkward time occurs for a unit when that personality departs. Lieut. C. H. Wilkinson, M.C., CRX. DE G., was perhaps the best subaltern the writer had under him during his regimental service in the war; he died of influenza on his way back from New Zealand to rejoin 2nd Bde., R.F.A. in the Spring of 1918.

Immediately on hearing this bad news, Group Cdr. visited 42nd battery, to see that things were for the moment in order, and all batteries (except 112th, which there was not time to do); he also gained personal touch with the F.A Groups on either flank.

Dec. 1/2. There was a good deal doing, one way and another, on 1st. Right Group answered 3 S.O.S. calls—one in the morning in support of 29th Div. on our right, one at 13.45 hrs. in aid of Left Group supporting 18th I.B., a third about Rumilly for 29th Div., in which 112th battery were the chief participants. Our troops to the South had failed to regain the ground as far as Villers Guislain. 29th Div. held to their line, though it was said that the enemy at one time penetrated Masnieres; that night we definitely evacuated Masnieres and the new front line of 29th Div. was about 1,300≅ away from 112th battery position. On the left, the enemy advanced on Cantaing, but was repulsed; there was again very heavy firing in the direction of Moeuvres and Bourlon Wood. In Right Group area, especially in the Grand Ravin, a lot of shells fell, which caused various casualties, including a slight wound to O.C. 53rd battery. 2nd Bde. R.F.A. had for the nonce lost its wagon lines and found it hard to

[1] Vol. 1., Nos. 5 & 7, contain under this heading an account of the experiences of some artillery units lying to our right (S.) on this day of many incidents.

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maintain battery ammunition dumps. Communications were not working well this day, and one had to rely to a considerable extent on visual through 53rd. A new commander appeared for 42nd battery.

After dark Major Robertson was buried to the accompaniment of 4·2 shells, which fell with persistent accuracy just far enough away to the right to allow the party to complete its sad task; it was indeed a soldier's funeral.

Daylight on Dec. 2 disclosed a number of strange batteries in Right Group area, chiefly in the Grand Ravin, where they had arrived during the hours of darkness. 6th Div. frontage (but not as yet Right group frontage) was extended owing to 16th I.B. taking over 87th I.B. ((29th Div.) line.

Dec. 3. By far the busiest day of this period was 3rd December. The enemy attacked all day on the Flot Farm—Rumilly front. At 10.45, 13.45, 14.20, 15.10 hrs., Right Group was engaged in answering S.O.S. calls. At 15.00 hrs. 112th battery said we had retired to West of Marcoing, and at 15.30 hrs. 71st I.B. thought Marcoing was in enemy hands; enemy patrols were reported at 14.45 hrs. to have been seen in Marcoing, having probably worked their way along the canal bank.

Although it turned out later to be incorrect that Marcoing was in possession of the enemy, a conversation with 71st I.B. resulted in a decision to withdraw batteries to the area approximately L 31 b, already reconnoitred by B.C's. With the approval of 6th D.A., the withdrawal was carried out, well and quickly, 42nd battery remaining in its position, to cover the right flank of our infantry still at Noyelles. Position 7 on map. An arrangement was arrived at with Left Group to extend their barrage, so that between the two groups the whole 6th Div. front could be properly supported.

After dark, 71st I.B. and Right Group Hdqtrs. withdrew together to Ribecourt. Between 23.00 hrs. on 3rd and 02.00 hrs. on 4th, Group Commander was able to visit all batteries in position along the Ribecourt—Villers Pluich Road. With a quiet night, the clearing of ammunition from the old positions and the re-establishment of communications was successfully accomplished.

To the right (S.) the enemy, who had already gained ground on 2nd, this day captured the important heights about La Vacquerie.

At 13.00 hrs. 2nd Bde. R.F.A. suffered a further disaster, in that an officer of 53rd was killed and the two remaining subalterns of 42nd battery wounded whilst observing from Nine Wood; the O.P. there had always given cause for concern; some sort of a trench had been dug for it, else the whole party would have been wiped out. Actually 42nd battery had in these 10 days lost its commander and 7 subalterns, amongst the officers only.

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Dec. 4/6. On the morning of 4th, C.R.A. 6th Div. met Group Commanders at Boar Copse (Le Bosquet) and announced intended general "withdrawal" to Hindenburg Support Line. The enemy use of gas against Bourlon Wood had proved too much for us. There was to be, after the withdrawal, a Group in support of each I.B.; the present Right Group would become Centre Group, losing 112th battery, but getting the whole 232nd Army Bde. R.F.A., (three 18-pr. batteries, no hows.) instead. In the afternoon the new Boar Copse positions were reconnoitred in detail. Later it was announced that the withdrawal was to take place this night (4/5/).

The retirement of the batteries required careful staffing, adequately to protect the rear-guard[1] which the infantry would leave in position until the new line was properly occupied (03.00 hrs. on 6th). In the event, leading sections of all batteries moved before midnight, to "warm" the new positions, while the bulk of remainder retired between 03.30 and 04.30 hrs. There was much hostile shelling, but the move passed off uneventfully, except for the destruction of one complete gun-team of 53rd battery. Position 8 on map.

Probably the enemy had not discovered our "withdrawal," for 5th was a quiet day; Right Group was duly grateful, there being an endless amount of things to arrange, especially as it was notified that 232nd Army Bde. R.F.A. was to leave Centre Group on replacement by 155th Bde. R.F.A. of which D/155 and B/155 joined (without ammunition) before dawn on 6th.

Further, one had to consider the possibility of still further withdrawal. The British Army was new to "withdrawals" at this period of the war; the experiences of the last few days had been somewhat alarming; many guns had been lost on our right; it was advisable to consider the circumstances under which battery commanders might have to chose between abandoning their guns after taking breech-blocks, etc., or fighting them to the moment of capture. Withdrawal can quite easily become a habit, so at least one seemed to be finding.

The night 5/6 in Ribecourt was about the worst the writer experienced throughout the war. There was no cover other than than from weather and the enemy kept up a terrific fire with large-calibre stuff on the village. Once again, one felt grateful to him for the extreme accuracy of his guns and the good training of his detachments! The points chosen by him as targets (road-junctions, of course) lay on either side of "where our caravan had rested"; each M.P.I. lay just, but only just, far enough away to give a little confidence, which looked like fortitude. There were many casualties on the roads about, and the "padre" nearly left this world of shells and sorrow for a better, brighter, area. At the very worst moment, 01.50 hrs. on 6th, news was received of expected enemy attack, and Right Group was ordered to carry out "Counter-preparation" on a big scale—the first

[1] Rearguard did not retire the whole distance, but remained on the line L 28 a 3/8 —Premy Chapel, which eventually became more or less an outpost line with only very distant artillery support.

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time this term had come to the writer's notice, except in translated German documents; there was to be heavy harassing fire from 02.00 to 06.00 hrs. and a sort of barrage from 06.00 to 06.30 hrs. All the lines had been broken, and it became necessary for the acting Bde. Signal Officer to use orderlies, whilst arranging visual. Strange to say, none of the orderlies were hit, and visual was established—a most dangerous period for the officer in question, for which he was justly rewarded by a M.C.; it was a really good performance, which resulted in all batteries opening fire by 04.12 hrs.

In the end there was no enemy attack, whatever may have been his intention; enemy fire had stopped almost directly our Counter-preparation proper began; our own shooting was stopped before 07.00 hrs.

During 6th, Centre Group Hdqtrs. moved to a trench dug-out (of a peculiarly "movie" nature) at K 36 a 6/0; Group Commander accompanied 71st I.B. headquarters to another locality, L 32 a 3/3. C/155 and A/155 came into line and the whole 155th Bde. R.F.A. was formed into a sub-group, 232nd Army Bde. R.F.A. also remaining for some considerable time with the Centre Group.

CHAPTER VI. THE AFTERMATH AND A NEW PRELIMINARY.

From this time on, the air was full of "war and rumours of war," for the Russian tangle meant almost certain attack in force by the Germans on the Western front. Details of defence schemes became matters for grave consideration, and soon the daily delivery began to consist chiefly of ideas how to meet the threat. First question, would the enemy produce tanks?

Apart from this general precautionary attitude, an attempt was expected from the enemy to complete recapture of ground won by us in November. Our new child, Counter-preparation, became an important personage directly she was introduced to us; not only was her name constantly on our tongues and in our correspondence, but also was she in these times a daily deed of dawn.

Trouble occurred at once in connection with alleged "short" shells at the point of the new salient. One eventually concluded that it must be enemy fire from captured 18-prs.; there seemed no other solution of the problem as to their source. In the writer's experience this almost always happened when operations resulted in the formation of a salient; short shells cause bad feeling; it is equally annoying for artillery commanders to be threatened with "disciplinary action" and for the infantry to have aspersions thrown upon their moral. Did the Germans, knowing from experience what happens, deliberately use captured guns against such a salient, at the risk of casualties to troops in their own re-entrant? One would think not; but sometimes, at any rate, it appeared that no British guns had been firing at the moment. A good aeroplane photograph shows both the artillery *and the infantry* where our infantry are, about which there has been known

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to be uncertainty. The principal trouble in this case seemed to be fire from somewhere W. of Ribecourt on to the ground S. of Premy Chapel; its source was never discovered and complaints were still being received at Christmas.

On 12th December, 19th Div. relieved 6th Div.—headquarters and infantry; that divisional artillery should remain "in" was also not unknown! There is a question, when this happens, whether Father should remain to care for his own children, or whether they should be left to the mercy of a step-papa; an argument for Father remaining is that a divisional artillery brigade without its own C.R.A. is a more hopeless orphan than even an Army Brigade—note what happened on Dec. 26th. The reason on this occasion was the very good one that 19th Div. Art. was still employed elsewhere; the question was settled by C.R.A. 19th Div. taking over the duty; the step-papa behaved in an absolutely model manner—further, he had a remarkable aptitude for getting things the batteries needed. Altogether 2nd Bde. R.F.A. found 19th Div. and V. Corps (now our masters) very pleasant to serve, which is not invariably the case when strangers are thrust into one another's company.

About this time the Centre Group became once more Right Group, lost this and got that battery, undergoing a hundred-and-one minor modifications to keep one busy. Throughout the period 2nd Bde. R.F.A. and a portion of 155th Bde. R.F.A. remained the Group nucleus.

Other activities of the period were connected with the arrival of Lewis guns for anti-aircraft purposes; anti-tank guns, i.e., guns sited in anticipation of a first-class hostile offensive with tanks, whose chief desiderata were difficulty of detection and a clear field of fire, the final result of which policy proved to be the unnecessary loss of an additional number of guns when the hostile attack came off without tanks on 21st March; attention to reserve positions selected to meet various contingencies; re-entry into the line of "toc-emmas"; employment of a mode of warfare[1] much favoured by C.R.A. 19th Div., but heartily disliked by the infantry, known as "galloping guns," which consisted in the bringing up to the closest range at night of single guns against some predetermined target.

On 26th December 2nd Bde., R.F.A. was relieved.[2] On 27th it moved to a back area. Just as it was leaving, there could be heard behind it (in the forward area) a violent bombardment. According to pre-war teaching, one should have marched to the sound of the guns; but war seemed different from that we had studied, and Bde. Commander shamelessly pursued the brigade way Westwards

[1] Very fine training for the younger officers.

[2] Bde. Cdr. as senior officer present with 6th D.A. had to decline the disagreeable task of deciding whether 2nd or 24th Bde., R.F.A., should be relieved; for the authorities had decided to retain one in the line, and there was no one of sufficient position present to urge a protest; It was 24th Bde's turn for a rest, but their casualties had been negligeable, whereas 2nd Bde. had lost 13 officers and one of its batteries was terribly shattered.

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over roads nearly impassible from frozen snow. Two or three days later it reached a real haven of rest[1] where it was met by a brusque request to send back representatives to clean up some wagon-lines, while Bde. Commander should at once assume command in the line of another brigade whose lieut.-col. was on leave. At the risk of the "slight reprimand," Bde. Commander successfully avoided performance of both these "unpleasant duties," for help in being able to do which he gratefully acknowledges thanks to C.R.A 19th Div.

When 2nd Bde. moved eastwards after a wintry but delightful ten day's repose and convalescence, it was to take over a portion of the line where in due course it would receive the full shock of the great German offensive of 1918.

* * * * * * * *

The preceding chapters must be vastly uninteresting to the general military public, if looked upon as domestic military history; they may bear another aspect if taken as a framework on which to consider modern developments, such as tanks and tractors, wireless, improved co-operation with aircraft, etc. The writer has endeavoured to lay out his tale as it appeared at the time and he believes there is no actual discrepancy between the events as herein related and the version given in the official dispatches, just re-read by him with special care. Certainly, in places, the things "look different"; so do short shells to the infantry or artillery! There is always more than one view from the tower.

Reference has already been made (in Chapter III of this paper) to the then new experience of an attack of tanks *en masse* combined with a barrage; other details in connection with the tactical management of a F.A. Group in battle have been discussed at length in the previous papers "A F.A. Group in retirement" and "A F.A. Group in the General Advance"; it would be repetition to write out special conclusions to this paper.

But the writer, greatly daring, ventures a few remarks on a rather wider and more general field.

Military History, it has been suggested, takes insufficient account of psychology; historically this battle of Cambrai will rank only as an episode, perhaps as a "might-have-been"; psychologically, it possesses the germs of great interest. *Firstly*, it was an exploitation of Surprise, which is a psychological weapon. *Secondly*, it shows that one can create a flank, as was conclusively proved by the "Riga manœuvre," even on a narrow front. But a break on a narrow front needs a "mass of manœuvre" to exploit it, whereas reserves on a wide front are "local reserves." There was conflict before the war between the French and German doctrines of war—see Colonel de Grandmaison's "Deux Conferences (Fevrier) 1911)"; the French believed in penetration at

[1] A Fairy Princess, daughter and heiress of the headquarter chateau, honoured us one night with her company at dinner; she was duly fallen in love with by a susceptible orderly officer, who endeavoured to explain his intense grief at approaching separation with the words "Je pongserai toojore de la feel *de derriere*."

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the correct moment of an extended enemy front by a "mass of manœuvre"; the Germans believed in discovery of the enemy mass and its envelopment by an extended line, strong enough everywhere to resist penetration, strongest on one, or on each, extreme flank. British thought favoured the French doctrine because we expected to be numerically inferior, but admitted the advantages of the German doctrine given numerical superiority. The Germans, naturally, began the war on their own doctrine as the French did on theirs; oddly enough, roles were reversed at the end; the Germans now numerically inferior, exploited the French doctrine under the name of the "Riga manœuvre" while the Allies, having marked numerical superiority, though unable to practise envelopment, did what they could by advancing in strength all along the line. At Cambrai we seem once more to have attempted the French doctrine, *but without the necessary mass of manœuvre;* it was in the nature of a bluff with tanks and cavalry. *Thirdly,* Cambrai was of interest, perhaps its principal tactical interest, and the source of eventual success, in the employment of tanks *en masse,* about which no more need be said here. *Fourthly,* the result seemed to settle once for all the question whether cavalry could be used on the Western front. It is true that Germans say now "yes," and endeavour to picture to themselves the vast advantages which would have been theirs, if they had had a strong force of cavalry in March, 1918. But could not their infantry have done what their cavalry might have done? Would not British infantry somehow have stopped those cavalry masses and disintegrated them? One is left with the conclusion that Cherfils' pre-war ideas were only an attractive hypothesis, for cavalry must adopt close formation to penetrate in sufficient strength, and a few machine guns can stop them. To which conclusion all the warring nations seem to have come; but, mark you, there should be interesting developments of Cherfils' theory of employment of strategic cavalry as applied to a large force of tanks and armoured cars.

The last and, as regards field artillery, the most interesting thing to notice was the effect of dissolution of control (with the commencement of movement) on the handling of smaller formations. It was a favourite theme of the writer's before the war that the nearer the battle reached to position warfare, the more important became control; the more movement, the less control and the more co-operation. "Artillery must be controlled, but the principle of co-operation is superior to that of control." We had had little ebb and flux since 1914; at Cambrai we had some, and might have had more. See how the F.A. brigade, enlarged to a Group of ever-varying composition, became the tactical unit of field artillery! Tactically, the most important officer for a field artillery brigade commander was his infantry brigadier; with movement came something very nearly approaching "mixed brigades." It may be that neither infantry nor artillery commanders realised the effect of this at once, on administration as well as on tactics. The lesson to be learned is co-operation, not only with gun-fire, but with actual personal good will; it is not usually the junior who has the easiest task in such combinations.

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A surprising thing is that from 20th November the writer remembers no personal co-operation with representatives of the heavy artillery until about 7th or 8th December, when the counter-battery staff found it advisable to ask field artillery units in the line to assist in the location of hostile batteries. Can such a state of affairs be for the best?

The waging of war, like everything really tackled, proved much easier than one thought it would be from experiences at practice camps; but one was left at the very end of the struggle with an uncomfortable feeling that co-operation between infantry and field artillery had not yet reached a state of perfection; that field artillery, as then equipped and drawn, was not able to provide that degree of close support—especially in the later stages of the battle—that the infantry desires and deserves. On the side of the infantry, perhaps a little more consideration for mundane things like accommodation, a better understanding of the essentials of artillery control, a little better tactical information passed during the battle, might help matters. On the side of the artillery, shrinkage to disappearing point of the number of short shells by means of technical training, and tactically, greater and yet ever greater efforts by more forward action on the part of artillery commanders to give the most immediate support to the infantry in the unforeseeable stages of the battle.

A knowledge of how very difficult it is to provide the infantry with this close support in the most efficient manner, is some consolation to the writer for the improbability of ever having again to attempt the task himself. It is true that the first duty of the artillery is to hit, and that ineffective fire is generally worse than useless; *but who knows whether fire somewhere else is being effective or not?* It may happen that fire quickly produced from the right place at the critical moment will achieve decisive influence upon the moral of the attacker, or defender, *or both.*

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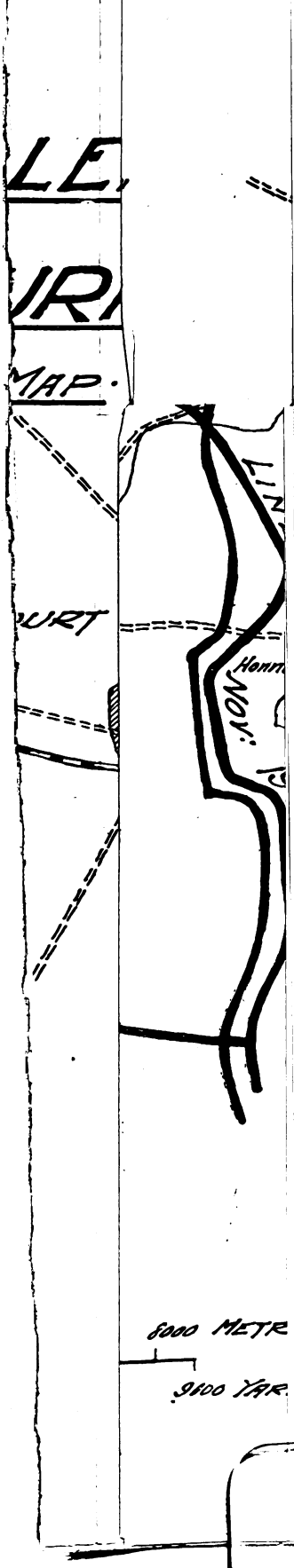

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BRITISH HEAVY AND SIEGE BATTERIES IN FRANCE.

AUGUST—NOVEMBER, 1914.

(With two appendices).

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"Les grandes batailles se gagnent avec de l'artillerie; ayez beaucoup de pièces de 12"[1] *Napoléon. (20 Nov. 1813—Corr. 20,929.).*

AS the War Diaries of the British Heavy and Siege Batteries, which went overseas in the opening months of the war, have just been examined for certain information, a summary has been made of their contents. It is hoped that this brief record will be of some assistance to officers of the Regiment, who are interested in that period, and that it will show the surviving officers of those units that the records are very scanty for those early days, and that if they can furnish any additional information of their doings and activities, it will be of the greatest benefit to later historians and particularly to the Regimental Historian. This summary will also show that although the German Army in the Field was, in 1914, undeniably far better equipped with heavy ordnance and ammunition, yet, by November 1914, the British Army was not entirely destitute of medium and heavy artillery, though in some cases ammunition was not too plentiful. Still, great efforts had been and were being made to provide the B.E.F. with the means of replying to the numerous heavy guns and howitzers brought into action by the enemy. Many months, however, were to pass before the adverse balance was entirely redressed.

It will be convenient to show, month by month, the Heavy and Siege Batteries that went overseas, distinguishing between the old existing units and those which were formed, or brought into being, on the opening of hostilities; and, when each is first mentioned, the part played by it will be briefly stated.

The following units landed in France in August, 1914 :—

HEAVY BATTERIES.

26 Heavy Battery (4—60-pdr. guns).

Formed in 1794 as the Royal Irish Artillery[2] it was reduced in

[1] The terrible 12-pdrs. of the Guard, the Emperor's "most beautiful daughters," may be compared with the 60-pdrs. of 1914.

[2] For linking up the Heavy and Siege Batteries, existing in 1914, with their original formations, I am indebted to information supplied in 1917, by the R.G.A. Record Office.

The war services are taken from the exhaustive list compiled by Lieut.-Colonel H. W. L. Hime, R.A., published in January, 1890.

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1819. Re-formed in 1900, as 31 Company, Western Division, R.A., it became 26 Heavy Battery in 1903. In 1914 the battery went to France with the 1st Division, landing at Boulogne on 17th August. It fought with its division all through the campaign from August to November 1914, including the Battles of Mons, the Marne, the Aisne, and Ypres. On 31st October, during the last-named battle, the right section of the battery, under the battery commander (Major G. T. Brierley, D.S.O.), was in action about three-quarters of a mile south of Hooge, when it was ordered to destroy the steeple of Zandvoorde Church, in which a German observation post had been located. An officer was sent forward to range on the target. With the fifth round of time-shrapnel the roof of the Church was hit, and the third round of lyddite hit the base of the steeple and swept it away. On the same day whilst visiting the left section of his battery to the north of the Menin road, near Veldhoek, Major Brierley was severely wounded. On 1st November the battery came into action about a quarter of a mile south-east of Hell-Fire Corner. On 13th November "at about 10 a.m. a German field-battery began to shell the battery "[26 H.B.] which it took in enfilade and slightly in reverse. The "second shell killed 1 and wounded 8 men—from this time on until "4 o'clock the shelling was continuous, both with shrapnel and 6" "H.E., and at about 3.30 p.m., a shell fell through the top of a house "and killed Major [J.H.] Massie [D.S.O.][1] and wounded Captain "[D.] Macleay, 1 man being killed, and 2 wounded."

Early on 14th November the battery moved into a new position near Potijze. At 7 p.m., one gun was sent up to a position near Hooge, about 800 yards in rear of the front line trenches, and fired 10 lyddite at Gheluwe to salute Prince Eitel Friedrich, who was thought to be in that village. The gun rejoined the battery at 10.30 p.m. On 19th November a pom-pom came up to the battery position and opened fire on a German aeroplane and hit it. The aeroplane came down in the lines and was captured with its pilot; the latter must have been a strong believer in Kismet after that occurrence. Early on 21st November 26 Heavy Battery drew out of action and moved back to rest and refit.

35 Heavy Battery (4—60-pdr. guns).

Formed in 1794 as No. 4 Coy., 5th Battalion, R.A., it became 35 Heavy Battery in 1906. Included in its previous war services were Roliça,[2] Vimiero, the Retreat to Corunna, and Tarragona. It

[1] Major Massie had taken over command of 26 H.B. on 5th November. On 21st November, Major E. V. D. Riddell arrived and assumed command.

[2] No. 4 Coy. 5th Battn.. R.A.—known at Roliça as Geary's Company—had its Commander, Captain Henry Geary, killed in that action. The French were about 60 yards away and Geary had fired one round of canister at them. Then, as he layed the second round, he said, "I'll be properly into them this———," when he fell dead, shot through the head.

Geary's Company and Captain R. T. Raynsford's Company were the two British artillery units (under Lieut.-Colonel W. Robe) that were present at this, which so far as our share is concerned was, the opening action of the Peninsular War.

(Continued on following page).

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was now destined to take part in another great retreat—that from Mons. The battery went to France with the 2nd Division, disembarking at Boulogne on 19th August. It fought with its division throughout 1914, including the Battles of Mons, the Marne, the Aisne, and Ypres. From 22nd August to 5th September (both dates inclusive) the battery marched 250 miles, the greatest distance covered on any one day being 24 miles. In the advance to the Aisne, 6th—13th September, 84 miles more were marched, making a total of 334 miles in 23 days, without a single rest day.[1] Whilst on the Aisne, between 13th September and 12th October, the battery fired 2,241 rounds (1,278 being lyddite). In the Battles of Ypres, between 21st October and 20th November, the battery expended 3,169 rounds (1726 lyddite). On the move north the battery, on reaching the Ypres neighbourhood, came into action on 21st October to the south of St. Julien; it then moved into action near St. Jean, and on 26th October it unlimbered close to Westhoek, and remained in the same position until early on 21st November when it was withdrawn to rest and refit. On the 14th November D sub-section gun was disabled by a broken spring case; it was taken out of action, sent back to Vlamertinghe for repair, and rejoined on the 21st. On 11th December the battery came into action half a mile west of Neuve Eglise.

48 Heavy Battery (4—60-pdr. guns).

Formed in 1795 as No. 10 Coy., 5th Battalion, R.A., it became 48 Heavy Battery in 1904. Its previous war services included the great Peninsular sieges—Cuidad Rodrigo, Burgos, San Sebastian, and Bayonne. It also took part in the siege of Badajoz and found some of the detachments which manned "the battering pieces, those honoured guns which shook the bloody ramparts of Badajoz."[2] Its service in the Great War, however, was practically in a siege so prolonged that its former glories shrink almost to insignificance.

The battery went to France with the 3rd Division, landing at Rouen on 20th August. It fought with its division during 1914, being engaged in the Battles of Mons, Le Cateau, the Marne, and

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Actually Captain Raynsford's Company had the honour of firing the first two rounds from British guns in this long drawn-out struggle. They were both shrapnel (then called spherical case) with fuzes cut for 850 yards. Both shells "burst beautifully" and disposed of a considerable number of the enemy.

Raynsford's Company was originally raised in 1803 as No. 9 Coy., 8th Battn., R.A.; and in August, 1914, it was represented in the Regiment by 78 Company, R.G.A., then quartered at Singapore.

One of the most graphic accounts of Roliça, and of the subsequent Battle of Vimiero, is to be found in "*Recollections*," by Colonel Landmann, R.E.

[1] It is true that on 29th August the battery only moved 2 miles.

[2] Napier V., 159.

In 1812, in accordance with the custom ruling at that time, No. 10 Coy., 5th Battn., R.A., was known as Captain Glubb's Company, though at Badajoz Captain Power was actually in command of it.

The Capture of Badajoz in 1812 may be compared with the Battle of Messines, 1917. Of the former operation 'so fiercely fought, so terribly won,' Colonel J. T. Jones, R.E., wrote in his *Journals of the Sieges in Spain*, " . . . . as an engineer and artillery operation it succeeded to the utmost letter . . . ." and again " . . . . the efforts of British troops occasionally set all calculations at defiance . . . ." Both these comments apply equally to Messines.

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the Aisne. When the 3rd Division moved north from the Aisne, 48 Heavy Battery came into action on the Neuve Chapelle front and took part in the Battle of La Bassée. When the 3rd Division moved further north into the Ypres area, the battery accompanied it and unlimbered near La Clytte on 19th November, opening fire the next day. Thus 48 took part in the closing scene of the Battles of Ypres. On the 22nd the diary states that 50-pdr. ammunition was being used. The battery remained on the same front for the rest of the year. On 16th December it appears to have received its first issue of the 1/20,000 map, which is stated in the diary to be "very accurate."[1]

108 Heavy Battery (4—60-pdr. guns).

Formed in 1904 as 108 Company, R.G.A., it became 108 Heavy Battery in the same year. Thus its first war service was performed on the Western Front in the Great War; and, whilst it was making history, it built up a record of present achievement that will go far to assist it in dispensing with the earlier memories of the more senior batteries. The battery went to France with the 5th Division, landing at Boulogne on the 18th August. It fought with its division during 1914, and with it took part in the Battles of Mons, Le Cateau, the Marne, and the Aisne. In withdrawing from its position at Le Cateau, on 26th August, one of the guns upset in a deep ditch, could not be extricated, and was abandoned. During the retreat it soon became evident that both a water cart and a supply vehicle should form part of each heavy battery ammunition column. This had not been allowed for in War Establishments. Consequently unless its ammunition column marched and bivouacked with the heavy battery to which it belonged, a considerable amount of inconvenience was caused to it. There is one story recorded in the Battery War Diary which has been missed by the historians both of the 5th Division and of the 5th Divisional Artillery, and it is given here so that it may be rescued from oblivion. On the 10th September, during the Battle of the Marne, the Diary states :—

". . . . Yesterday we had fired first a lyddite, which I[2] did "not see, then a time-shrapnel, which appeared a good deal too "much to the right and about which I was rather anxious. The "effect of the lyddite was afterwards visible in the shape of a "somewhat big conflagration. This morning [10th September] "in the village of Dhuizy [north of the Marne and 7 miles east "of Lizy sur Ourcq], to which I had ridden in advance of the "Battery, there was a house obviously newly burnt. I learnt "that a local inhabitant had given the following information—a "German General and his staff had been in this house when it

[1] A large-scale, squared map was issued to the artillery by 26th October 1914. This fact is mentioned in the G.S. Diary of the 4th Division on that date. (At this time the 4th Division (III. Corps) held the front astride the River Lys, in front of Armentières).

[2] The Battery Commander was Major C. de Sausmarez, D.S.O. On the 9th September, 108 H.B. was in action mid-way between the Petit Morin and the Marne, and about 3½ miles to the east of La Ferté sous Jouarre. The German general may have been von Kraewel, who commanded a composite brigade at the end of the Battle of the Marne, or possibly von Schmettow, commanding the German 9th Cavalry Division.

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"was hit by a shell which set fire to it. Rushing out of the "house they went up another street, when a second heavy shell "burst close to them. They ran in another direction, only to be "headed back by a third shell. Whereupon according to the "French villager, the General and his staff *'poussèrent un cri "épouvantable qui dura pour trois minutes!'* "

With their Boche thoroughness no doubt they were sure that the shells were deliberately fired at them. But the full irony of the situation is realised on reading the next sentence of the diary :—

"It seems possible that two of these shells were those which "the battery fired too much to the right yesterday . . . ."

On 27th September, whilst in action on the Aisne, Major de Sausmarez was severely wounded. He was succeeded on the 3rd October by Major G. E. Tyrrell. Before the battery left the Aisne a new gun was received to replace the 60-pdr. lost at Le Cateau; it arrived at 5.30 p.m., on the 4th October. When passing through St. Pol, during the move north from the Aisne, another new gun was issued to the battery to replace one with defective springs. On reaching the front with the 5th Division, the battery first came into action near the La Bassée Canal, and thus took part in the Battle of La Bassée. One gun was disabled from the 13th to 17th October, but was repaired and was in action again on the latter date. When the Lahore Division relieved the 5th Division, 110 Heavy Battery relieved 108 Heavy Battery, and the latter pulled out on 31st October and moved north towards the Ypres area. On 2nd November the battery opened fire from a position near Lindenhoek (south of Kemmel), remaining here until the end of the year. It thus bore its share in the heavy fighting that marked the concluding stages of the Battles of Ypres.[1] This battery also used 50-pdr. lyddite and complained (10th December) when ordered to knock down Wytschaete Church tower that these shells only made holes in the solid stone structure and seemed incapable of bringing it down.

Total landed in France in August 1914 :—

4 Heavy Batteries : 16—60-pdrs.

The following units landed in France in September 1914 :—

HEAVY BATTERIES.

31 Heavy Battery (4—60-pdr. guns).

Formed in 1879 as 19 Battery, II. Brigade, R.A., it became 31 Heavy Battery in 1903. The battery formed part of the 4th Divi-

[1] The geographical limits assigned to the Battles of Ypres 1914 in the *Official Names of the Battles . . . fought . . . . during 1914-1919* . . . . require revision. A study of the German account of *Ypres 1914*, (English translation published by Messrs. Constable & Co.) shows that the operations are one and indivisible from Houthulst Forest to the River Lys. The Battles of Ypres, in this account therefore, are taken to include all the fighting that took place to the east of Ypres and between the north and south limits just mentioned. Thus they include the Battle of Messines and part of the Battle of Armentières, which are given separately in the official list.

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sional Artillery in 1914. Its division only landed at Boulogne, Havre, and Rouen on the 23rd August, but proceeded at once to the front and arrived in time to take part in the Battle of Le Cateau, 26th August. The fate of its heavy battery, however, was very different. It reached Boulogne on 24th August and landed, but re-embarked on the 25th. It then sailed to Havre on the 26th and disembarked there on arrival. Here it remained at the rest camp until the 2nd September, when it embarked once more and sailed next day. It reached St. Nazaire, at the mouth of the Loire, on 5th September, the last day of the retreat from Mons, and completed disembarkation on the 6th. On the next day it entrained for the front, and joined the 4th Division, south of La Ferté sous Jouarre at 8 p.m. on the 9th September, before the end of the Battle of the Marne. It took part in the advance to the Aisne with its division and came into action for the first time on 12th September to the north-east of Septmonts (S.S.E. of Soissons). It then took part in the Battle of the Aisne, supporting its division and the II. Corps. One gun became a casualty on 30th September owing to damage to the carriage. This was replaced on 10th October on the move north. On 17th October the battery came into action to the west of Ploegsteert Wood covering its division, and remained in this neighbourhood, behind the 4th Division, until the end of the year. It thus took part in all the main fighting of the Battles of Ypres, between Messines and the river Lys.[1] On December 24th the I.O.M. inspected the guns and reported that they were coppered beyond the prescribed limits. The guns were withdrawn in turn to be decoppered, two being overhauled and returned by 31st December.

24 Heavy Battery (4—60-pdr. guns).

Formed in 1800 as No. 9 Coy., 6th Battalion, R.A., it was reduced in 1882. Re-formed in 1900 as 30 Company, Eastern Division, R.A., it became 24 Heavy Battery in 1907. The battery formed part of the 6th Division in August, 1914 and went with it to France.

It embarked on two ships at Southampton on 9th September. The mouth of the Loire was reached on the 11th; the next day both ships proceeded up the river to St. Nazaire, and the last section of the battery finally completed disembarkation at 6 p.m. on the 13th. Entraining as soon as they were disembarked—left section and ammunition column at 8.30 p.m. on the 12th and the headquarters with right section at 11.15 p.m. on the 13th, both sections detrained at Chateau Thierry, on the Marne, on the 15th. The battery marched forward that evening with the rest of the 6th Divisional Artillery. On the 17th, 24 Heavy Battery was pushed forward and temporarily attached to the 5th Division. It came into action alongside the 108th Heavy Battery, on the south bank of the Aisne and about three and a half miles west of Braisne. It opened fire from here the next day. On

[1] The G.S. Diary, 4th Division, invariably prefaces its daily summary with a record of the weather experienced during the period described. With grim, but unconscious, humour its entry for 31st October 1914, begins:—"Slightly warmer day . . . ." It is questionable, whether, in all its long experience, the British Army has ever endured many warmer days!

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the 18th it was attached to the 4th Division and moved forward to a position about one and a half miles closer to the Aisne. On the 19th orders were received to economise ammunition. The battery remained in action behind the Aisne until its departure for the north on the 7th October. On the 3rd October it returned once more to its own division, being attached to the 4th Division again when the 6th Division was relieved by the French on the 6th.

During the advance of the III. Corps towards Armentières, 24 Heavy Battery first opened fire on 14th October from a position near Strazeele, W.S.W. of Bailleul. On reaching Armentières on 18th October, the battery moved to a position near Ploegsteert to support the 4th Division and next day it opened fire from here, thus participating in the opening stages of the Battles of Ypres. On the 22nd October, the battery fired its thousandth round against the enemy, 739 having been fired on the Aisne. On the 24th the left section remained in support of the 4th Division, whilst the right section moved south of the river Lys and rejoined the 6th Division. This latter section came into action about $1\frac{1}{2}$ miles south of Armentières and was engaged with its division in the Battle of Armentières. On the 26th October the left section rejoined the battery and came into action near Fleurbaix. On 1st November, as a result of the attack delivered by the Army Group Fabeck south of the Ypres—Menin road, the battery was pulled out and ordered to move to Nieppe; but counter orders were received and, as a result, the right section returned to its former position covering its own division, whilst the left section moved north of the Lys to support the 4th Division. The latter section came into action to the west of Le Bizet (north of Armentières) and opened fire at once. On the 3rd November the diary states that

> "the supply of 60-pdr. lyddite exhausted and the first three "rounds of 50-pdr. lyddite, fired with composite cartridge, being "blind, [right] section ceased fire pending complete test of this "ammunition."

On the 8th November the right section moved further south to the position near Fleurbaix, previously occupied by the left section, and on the 9th the battery fired its two thousandth round since arriving at the front. Attempts were made at various times by the right section to bring down Wez Macquart, Fromelles, and Beaucamps Church towers, used as O.P's by the enemy; but although direct hits were made on all of them, not one of them was demolished, the most damage being done at Fromelles. On the 15th November, the heavy fighting that marked the last half of the Battles of Ypres having died down after the Germans were shot to a standstill, the left section returned from the 4th Division. It took up the position formerly occupied by the right section to the south of Armentières. The battery had now expended 2,398 rounds, of which 1,659 were fired during the period covered by the Battles of Ypres and Armentières, in both of which the battery had been engaged. The sections remained in action on the Armentières—Fleurbaix front for the rest of the year, by which time they had expended 3,237 rounds.

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On 18th November a gun was sent down to the mobile workshop of the I.O.M. at Bac St. Maur for repairs to the carriage. This is the only mention of a gun casualty to the equipment, and it seems to have stood the strain very well of being continuously engaged for two and a half months.

109 Heavy Battery (4—4·7″ Q.F. guns).

Formed at Woolwich on 25th August 1914, the battery went to France, landing at St. Nazaire on the 24th September. It acted as the heavy battery with the Lahore Division of the Indian Corps, and in 1914 fought with its division on the La Bassée front. The War Diary records that the battery, which entered Orleans on the 27th September 1914, was the first British unit to enter that city since 1414. The first round ever fired from these guns was in action at 3.55 p.m., on 24th October. The battery shared the distinction, of going into action without any previous practice on the range, with all the other newly-formed heavy and siege batteries that went to France in 1914.

110 Heavy Battery (4—4·7″ Q.F. guns).

Formed at Woolwich on 1st September 1914, the battery went to France, landing at St. Nazaire on 25th September. It acted as the heavy battery of the Meerut Division of the Indian Corps and fought with it during 1914 on the La Bassée front.

SIEGE BATTERIES.

1st Siege Battery (4—6″ B.L. Howitzers, 30 cwt.).

Formed at Plymouth on 27th August 1914, the battery went to France and landed at St. Nazaire on 19th September. It joined the I. Corps on the river Aisne,[1] came into action near Chavonne on 24th September and opened fire the next day. Later it moved to Flanders with the I. Corps and supported it in the Battles of Ypres, being in action firstly near Boesinghe on 22nd October and then east of Ypres on 25th October, until it was withdrawn on the 15th November, when the I. Corps was relieved on this front.

2nd Siege Battery (4—6″ B.L. Howitzers, 30 cwt.).

Formed at Plymouth on 27th August 1914, the battery went to France and landed at St. Nazaire on 19th September. It joined the I. Corps on the river Aisne, came into action near Bourg on 24th September, and at 10 a.m. opened fire, being the first British siege unit to do so. Whilst in action on the Aisne, owing to the softness of the ground the guns sank as much as three feet, and sometimes they could only be extricated by a gyn. On the 26th September, No. 2 gun was sent back to England, the cradle being split. A fresh howitzer, to replace it, was issued to the battery on the 11th October.

[1] The Battle of the Aisne, with its subsequent actions, ends officially on 26th September, 1914 ("Official names of the Battles . . . . fought . . . . during . . . . the Great War 1914—1919 . . . .).

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On the 29th September, the first batch of heavy lyddite (122 lb.) arrived, and was found to be a great improvement on the 100-lb. shell.

Later the battery moved to N. France and was attached first to the II. Corps and later to the Indian Corps. It fought on the La Bassée front from 18th October, taking part in the Battle of La Bassée. Its Diary records that the light lyddite shell began to run short on 3rd November. The battery did such good work on this front, that when its men went back to the Locon baths they were given an extra quarter of an hour in the bath on stating that they belonged to the 2nd Siege Battery. Between 20th and 22nd October, whilst working with the French XXI. Corps, the battery demolished Vermelles brewery, whose cellars were used by the German reserves. Towards the end of the year, when covering the 2nd Division, after the transference of the I. Corps from the Ypres to the La Bassée front, a generous compliment was paid to the 2nd Siege Battery by the Officer Commanding the 2nd Coldstream Guards. He said to the Officer Commanding the relieving battalion: "The only thing which makes life bearable is the shooting of the siege 'Hows.'"

Note. The 1st and 2nd Siege Batteries were formed from an existing unit, 39 Company, R.G.A. This unit was raised in 1794 as No. 5 Coy., 5th Battalion, R.A. Among its previous war services were Alexandria, 1801 and the Siege of Flushing in 1809.

3rd Siege Battery (4—6″ B.L. Howitzers, 30 cwt.).

Formed at Plymouth on 27th August 1914, it went to France and landed at St. Nazaire on 19th September. It joined the II. Corps on the river Aisne and came into action near Chassemy on 25th September. When the B.E.F. moved north the battery was attached to the IV. Corps (3rd Cavalry Division and 7th Division) and took part with it in the Battles of Ypres. The battery was in action near Herenthage Chateau and opened fire on 25th October. On 1st November its Diary records that the howitzers had run out of light lyddite. The battery changed its position to one near Zillebeke on 2nd November and remained in action until withdrawn at 3 a.m. on 21st November.

4th Siege Battery (4—6″ B.L. Howitzers, 30 cwt.).

Formed at Plymouth on 27th August 1914, it went to France and landed at St. Nazaire on 19th September. It joined the II. Corps on the river Aisne and came into action near Le Mesnil (south of the Aisne and 1¼ miles south-east of Venizel). On 24th September it opened fire against Fort Condé at a range of 5,800 yards and obtained a hit with the first round. On 2nd October, when the 5th Division (II. Corps) was relieved by the 6th Division (III. Corps), the battery was attached to the latter. When the B.E.F. moved north the battery took part in the Battles of Ypres and came into action at Ploegsteert Wood, opening fire from there on 26th October, covering the 4th Division (III. Corps). It remained in action in the Ploegsteert Wood area during the whole of the Battles of Ypres, and was

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not relieved in 1914. On 1st December the Diary records: "A good day amongst the German billets. Have made most of them draughty, especially one that got it full in the face . . . ."

Note. The 3rd and 4th Siege Batteries were formed from an existing unit, 23 Company R.G.A. This unit was raised in 1811 as B Company, 1st Madras Battalion, R.A.

The 1st, 2nd, 3rd, and 4th Siege Batteries formed the I Medium Siege Brigade; all four batteries and their two ammunition columns went over to France in the same transport—the "Armenian." The Brigade was formed from two dismounted garrison companies, and the drivers only had one mounted parade before going into action.[1] On the way to the docks at Plymouth two mounted men were heard to say that they had never been on a horse before. The fine record of these batteries at the front redounds, therefore, more than ever to the credit of those officers and men who formed them.

5th Siege Battery (4—6″ B.L. Howitzers, 30 cwt.).

Formed at Plymouth on 27th August 1914, the battery went to France and landed at St. Nazaire on 29th September. Entraining for the Front on 19th October, the battery was attached to the III. Corps and, on 24th October, it came into action behind the 6th Division E.N.E. of Fleurbaix and thus took part in the Battle of Armentières. On 15th November the battery was attached to the IV. Corps; the right section covering the 7th Division from near Fleurbaix, and the left section, on 16th November, supporting the 8th Division from near Laventie, moving on the next day to another position near Vieille Chapelle. The battery did not move into the Ypres area until mid-December 1914, and then, after a stay of a week near Lindenhoek, it returned to Vieille Chapelle and Laventie.

6th Siege Battery (4—6″ B.L. Howitzers, 30 cwt.).

Formed at Plymouth on 27th August 1914, the battery went to France and landed at St. Nazaire on 30th September and entrained on "31st September" (*vide* Diary), but the orders were then cancelled and the battery detrained and moved back to camp. On 19th October the battery entrained for the front and, on 28th October, it was attached to the Cavalry Corps and took part in the Battles of Ypres. On 29th October it came into action on the ridge between Wytschaete and Messines, covering the 1st Cavalry Division. After the loss of the ridge on the 31st October[2] the battery had to retire; the order to retire reached the battery at 9.15 a.m., and it got away by 9.30 a.m. By mid-day it had come into action three miles farther back, in itself a fine performance when dealing with untrained Clydesdales.

[1] *War Establishments, Part I., 1914*, gave the composition of a Siege Artillery Brigade (Medium) as four batteries (each of four 6″ Hows.) and two ammunition columns, with a total strength of 979 all ranks and 597 horses. The strength of the siege battery was 184 all ranks and 107 horses.

[2] Strangely enough October 31st and December 31st are both left out of the Diary.

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On 7th November it moved into the III. Corps area and supported the 4th Division, opening fire from behind Ploegsteert Wood on 8th November. The battery remained here for the rest of the month.

On the 30th December it is recorded that No. 4 gun burst when firing heavy lyddite with full charge, as a result of a premature in the bore. The howitzer and carriage were blown to pieces, but only two casualties occurred.

Note. The 5th and 6th Siege Batteries were formed from an existing unit, 107 Company, R.G.A. This unit was raised in 1863 as 5th Battery, XXV. Brigade, R.A., and 6th Battery, XXIV. Brigade, R.A.

The 5th and 6th Siege Batteries formed the II. (Medium) Siege Brigade.

Total landed in France in September, 1914 :—

4 Heavy Batteries and
6 Siege Batteries :
8—60-pdrs., 8—4·7″ Q.F. Guns, and 24—6″ B.L. Howitzers, 30 cwt.

The following units landed in France in October 1914 :—

HEAVY BATTERIES.

113 Heavy Battery (4—4·7″ Q.F. Guns).

Formed at Woolwich on 26th September 1914, the battery went to France and landed at Havre on 4th October. On arrival at the front it was attached to the II. Corps. It came into action on the Neuve Chapelle front and took part in the Battle of La Bassée, opening fire on 26th October, one month after the date of its formation. It remained in this area until the end of November and, on the II. Corps moving to the Ypres front, it was transferred to the Indian Corps.

114 Heavy Battery (4—4·7″ Q.F. Guns).[1]

Formed at Woolwich on 30th September 1914, the battery went to France and landed at Havre on 4th October. Proceeding to the front, it arrived in time to take part in the Battle of La Bassée. It was attached to the II. Corps; and during November it came into action in the Festubert area.

115 Heavy Battery (4—4·7″ Q.F. Guns).

Formed in 1859 as No. 5 Depôt, R.A., it became 5 Company, R.G.A., in 1902; and from the latter was formed, at Woolwich, 115 Heavy Battery on 28th September 1914. 115 crossed to France and

[1] No diary exists for this battery. Its record has ben pieced together from the existing diary of its ammunition column and from any references to it that occur in other artillery diaries.

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landed at Havre on 4th October. On arrival at the front it was attached to the I. Corps and, with it, took part in the Battles of Ypres. 115 Heavy Battery opened fire at 2 p.m. on 30th October from near Klein Zillebeke and remained in action in this area until it was withdrawn on 22nd November, on the relief of the I. Corps.

The battery Diary records that "the 115 and 116 Heavy Batteries were the last British troops to leave the Ypres position," on relief by the French in 1914.

116 Heavy Battery (4—4·7″ Q.F. Guns).[1]

Formed in 1757 as No. 5 Company, 2nd Battalion, R.A., it became 100 Coy., R.G.A., in 1902; and from it was formed, at Woolwich, 116 Heavy Battery in September 1914. Among its earlier honours are included Gibraltar, 1779—1783. 116 went to France and landed at Havre on 4th October. On arrival at the front it took part in the Battles of Ypres. It was attached to the I. Corps and detailed to cover the front held by the 7th Division, south of the Ypres—Menin road. It opened fire (about) 28th October and was continuously in action until it was withdrawn with 115 Heavy Battery on 22nd November. (*Vide supra*).

111 Heavy Battery (4—4·7″ Q.F. Guns).

Formed at Woolwich on 1st September 1914, the battery belonged to the 7th Divisional Artillery. It went to Belgium with its division, landing at Zeebrugge on 7th October. On the same day it marched to Bruges, moving to Ostend on the 8th, and returning to Bruges on the 9th. When the 7th Division retired, the battery moved to Ypres, via Beernem (10th), Coolscamp (12th), and Roulers (13th). Ypres was reached on the 14th October. 111 Heavy Battery now took part in the Battles of Ypres, supporting its division. The battery opened fire on 19th October from south-east of Gheluvelt. On 23rd October it moved to a position about a mile north-east of Hooge, and it then moved to the south-west of Hooge on 5th November. Whilst in this position on 14th November an 8″ H.E. shell burst under the gun wheel of No. 3 gun, overturning the carriage and placing the gun permanently out of action.[2] The detachment suffered no casualties. On 15th November 111 moved to another position N.E. of Hell-Fire Corner. It remained in action here until it was withdrawn on 19th November, on the relief of its division.

112 Heavy Battery (4—4·7″ Q.F. Guns).

Formed at Woolwich on 7th September 1914, this battery also belonged to the 7th Divisional Artillery. It accompanied its division

[1] No diary exists for this battery. Its record has been constructed from brief mentions of it in the diary of 115 Heavy Battery, and from location statements in the A. and Q. Diary of the I. Corps. The actual day on which 116 was formed is uncertain.

[2] This gun was replaced on 1st December, 1914.

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to Belgium, landing at Ostend on the 7th October. Its itinerary, until its arrival at Ypres on 14th October, was the same as that of the 111th (*vide supra*). 112 took part in the Battles of Ypres with its division. On the 20th October it opened fire from a position north of the Menin road about a thousand yards west of Terhand. On 21st October the battery moved back to a position about half a mile south of Zonnebeke, and on 23rd October to another near Westhoek. Then on 4th November it moved back further and took up a position near Zillebeke. On the 18th November a gun-breech blew out killing 1 man and wounding 3 others of the detachment. The gun was sent down to the Divisional Ammunition Column the next day. On 20th November 112 was withdrawn from the Ypres area and came into action again south of the Lys. On the 7th December the damaged gun was returned from the A.O.D. "sentenced to fifty rounds." On the 11th December, however, the battery was lucky enough to exchange two of its guns for new ones, and on 15th December the remaining two were replaced in the same way.

Note. 111 and 112 Heavy Batteries formed III. Heavy Brigade, R.G.A.

Siege Batteries.

7 Siege Battery (1—9·2″ gun on railway mounting and 2—6″ guns).[1]

Formed at Woolwich on 2nd October 1914, from companies at Sheerness, Dover, and Plymouth, the battery was a composite formation. The 9·2″ Gun was shipped at Elswick, and proceeded direct to the port of disembarkation. The remainder of the battery began loading stores at Woolwich at midnight on 3rd October; the guns and tractors were conveyed in a separate ship; loading was completed by 9.15 a.m. the same day; and, at the Nore, the steamer containing the 9·2″ gun on railway mounting joined the convoy. But before it finally got into action the battery experienced a series of disappointments. Sailing via Dover and Dunkirk the battery finally reached Ostend on 6th October. Whilst the guns, etc., were being slowly unloaded, arrangements were made with the Belgian military railway authorities for a special train to take the advance party to Antwerp, and it left at 4 p.m. on 6th October. On arrival at St. Nicholas (12 miles south-west of Antwerp) it was ordered to return at once and, early the next morning, the party reached Ostend once more. Meanwhile on the 6th the 6″ and 9·2″ guns had been landed at Ostend. At 10 p.m. 7th October the Base Commandant asked for a party of 70 men to assist in defending the docks. At 5 a.m. on 8th October orders were received for the battery to leave at 8 a.m. by train for St. Nicholas and bring the guns into action there. After the train had been loaded the order was cancelled at 8.30 a.m. On 10th October orders were issued for the battery to re-embark; and on the 11th loading was completed. The Diary records that "the Belgian

[1] The 9·2″ Howitzer ('Mother') was originally allotted to the 7th Siege Battery and was, later on, to follow it to France. Actually, however, 'Mother' went out with the 8th Siege Battery about 10 days later. (*Vide infra*).

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army was marching in all day." Before the transport got clear on 12th October a German aeroplane, from a height of 1500 feet, attempted to bomb the ships and docks, but without effecting anything more than hitting the tender of an engine. Sailing at 3 p.m., via Dunkirk, Havre was reached at 10 p.m. on 13th October. Unloading began at 6 a.m. on the 14th October and was only completed at 6 p.m. on 16th October.[1] On the same day orders were issued for the 9·2″ gun with its personnel, R.G.A. and R.E., to return to England. On 17th October the 9·2″ gun was ordered to stand fast, but on the 21st orders were repeated that the gun and personnel were to return to England. The following story (not recorded in the Battery War Diary) purports to account for the return of the 9·2″ gun. On seeing the massive proportions of this gun and railway mounting the French military railway authorities would not allow it to proceed to the front, declaring emphatically "*les ponts pas assez solides*". Before leaving Havre, however, one of the officers of the detachment happened to walk out along the railway to see the fragile bridges. On the very first he reached he saw the exasperating spectacle of two railway engines calmly halted on the bridge and busily engaged in sucking water out of the stream. Nothing could be done and the 9·2″ returned sadly home.[2]

Ordered to proceed to Boulogne, on 21st October, together with the 8th Siege Battery, the start had to be postponed owing to the trouble experienced in getting coal. On 22nd October, the 7th Siege Battery started. It marched 33 miles to Yvetot, the first wagon arriving at 4 p.m. and the last at 9 p.m. The tractor of No. 2 gun broke down 12 miles away and the gun had to be railed on to Boulogne. On the 23rd October 25 miles were covered and St. Saëns was reached; on the 24th October the battery marched to Foucarmont (24 miles) and on the 25th to Abbeville (32 miles). The bridge over the Bresle at Blangy was considered unsafe and the 6″ gun and its tractor had to make a detour and cross the river lower down at Gamaches.

On the 26th the battery marched another 30 miles to Montreuil, and on the 27th covered the remaining 22 miles into Boulogne, the lorries arriving at 3.30 p.m., although the 6″ gun did not arrive until 8 p.m. The battery had marched 166 miles in 6 days. No. 2 gun had already arrived.

At 7 a.m. on 4th November the battery (together with No. 2 6″ gun of the 8th Siege Battery) started from Boulogne. The entry in the Diary reads:—". . . . 2 new tractors. Very bad hill out of "Boulogne, one gun stuck, and battery not over ridge before 11 a.m. "Reported to G.H.Q. and ordered to billet for night at Lumbres, "which place was reached by No. 2 gun at 11 p.m., No. 1 at 2 a.m.,

[1] The Diary for this day states:—"8th Siege Battery arrived from England—two 6″ guns and 9·2″ Howitzer—latter originally belonging to this battery".

[2] From one casual reference it appears that the 9·2″ gun on railway mounting may have returned to France on 27th October, but there is no record of any of its further activities in 1914. It is hoped that some officer, who served with it, can furnish a detailed narrative of the work performed by this gun in 1914 and thus fill a gap in the official records.

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"25 miles." Pushing on the next day along a "very greasy *pavé* road," Hazebrouck was reached by midnight 5th/6th November, but the No. 2 gun of the 8th Siege Battery did not get in until 11 a.m. on 6th November. The marching distance is about 22 miles along the main road. The 7th Siege Battery remained at Hazebrouck until 23rd November. On this day No. 1 gun was sent forward and took up a position three-quarters of a mile south of Locre, being attached to the 5th Division (II. Corps). On the 26th November, two rounds were fired by this gun to test the platform, and that evening No. 2 gun arrived and took up a position about a quarter of a mile nearer Locre and it opened fire on 30th November. The two guns remained in action in this neighbourhood for the rest of the year. On Christmas Day the left half-battery, two more 6″ guns, arrived and completed the battery on the 4-gun basis. On 31st December the left-half battery came into action south of Neuve Eglise.

8 Siege Battery (2—6″ guns and 1—9·2″ Howitzer. ['Mother']).

Formed at Woolwich on 5th October 1914,[1] the battery left for Avonmouth on 13th October, embarked there on the 14th, sailed on the 15th, and reached Havre on the 16th. Disembarkation began on the day of arrival and was completed on the 19th. Owing to "the difficulty of obtaining 5 tons of coal, which took four hours to draw," the departure for Abbeville was postponed until 22nd October. Marching via Yvetot (22nd) the battery pushed on to Neufchatel (23rd), but the 6″ guns were on the road until 5 a.m. on the 24th and two lorries did not get further than St. Saëns. Making a detour upstream to avoid Blangy with its doubtful bridge, the battery reached Aumale on the Bresle on the 24th, and from there it marched into Abbeville the next day. On the 27th the battery left Abbeville and reached Montreuil, and on the 28th it marched into Boulogne.

On 30th October the Right Section (one 6″ gun) left Boulogne and, marching via Calombert and Arques, reached Hazebrouck on 1st November. It moved to Bailleul on the 3rd and, on the 4th, came into action to the N.N.E. of Nieppe, supporting the 4th Division, opening fire on the next day. The gun remained in action here until the end of the month and thus took part in the severe fighting that marked the closing scenes of the Battles of Ypres. On 11th November the 6″ gun fired at Comines railway station at a range of 13,900 yards. This was repeated on 22nd November with the trail dug in, and an aeroplane fitted with wireless reported a hit with the eighth round, elevation 34° 12′.

The left section (one 6″ gun) remained at Boulogne from 30th October until 4th November when it marched with the 7th Siege Battery (*vide supra*). Lumbres was reached only at 4 a.m. on 5th November and all the rest of that day was spent in overhauling and repairing. Marching at 10 p.m. on the 5th, Hazebrouck was reached at 11 a.m. on the 6th. Here the left section remained until the 15th November. On that day it moved via Bailleul to Locre and took up

[1] The exact day of the month is not certain. It was before the 13th October, when the Diary opens with the entraining at Woolwich.

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a position about a quarter of a mile to the south-west covering the 5th Division. The gun opened fire on the 17th November. A crack developed in the "B" tube of the gun on the 19th, but the I.O.M., after inspecting it, pronounced it safe to fire. Whilst in action here the 7th Siege Battery (two 6″ guns) came into action south of Locre, and the three guns were occasionally used as a single battery. On the 3rd December it was considered that the left section gun "was not capable of accurate shooting." The left section remained near Locre until the 11th December, when it moved to Nieppe and joined the right section to the N.N.E. of that village; the guns remained in action here for the rest of the year.

The left half-battery (two 6″ guns) reached Bailleul on 30th December, thus completing the 8th Siege Battery as a 4-gun unit. On 31st December it is recorded that "Trial over bad road with caterpillar engine, drawing one 6″ gun and limber of left-half battery, took place near Bailleul. Ended by gun getting bogged and caterpillar failing to pull it out."

On this same day "B Section's gun [the original left section's 6″ gun] developed a serious choke and was finally condemned by the I.O.M. He anticipated this a week or more ago and wired for another."

The 9·2″ Howitzer—"Mother."[1]

The first equipment was only approved in July, 1914, and during that month she carried out her firing trials at Rhayader. When all the troops had to return to their mobilization stations, the howitzer was left at Rhayader railway station in the care of the local police, and eventually it was sent by rail to Woolwich. 'Mother' proceeded to France with the 8th Siege Battery in mid October, and on the 29th October she left for the front. During the night of 31st October/1st November, after ten hours strenuous work, 'Mother' was brought into action behind an orchard to the east of Lacouture. At 12.45 p.m. on 1st November she opened fire, assisted by aeroplane observation, at a range of 7,500 yards, against a German heavy battery near Lorgies. Two hits were reported out of eight rounds that were fired, and the enemy battery, which was enveloped in smoke for about a quarter of an hour, was put out of action. Thus 'Mother' was engaged in the final fighting of the Battle of La Bassée. During the night of 1st/2nd November orders were received to move the howitzer back behind the Bethune—Aire canal; but, after she was dismounted and had moved off, several contradictory orders were received and eventually 'Mother' left for Merville. After an exhausting and trying march Nieppe was reached on the 4th November, and the 9·2″ Howitzer was now attached to the 4th Division. During the night of 5th/6th November, 'Mother' was mounted in an orchard near Le Rossignol (two miles north-west of Armentières); and on the 7th she

[1] For nearly all this information I am indebted to a narrative sent in to the Historical Section by Colonel G. B. Mackenzie, C.B., C.M.G., D.S.O., R.A., in response to an appeal for further information published in "The Journal of the Royal Artillery." The official records are too meagre to be of any real assistance in reconstructing 'Mother's' early history and activities. They merely serve to whet one's curiosity and desire for knowledge, without doing anything to satisfy either.

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opened fire from here against Warneton, at a range of 8,700 yards. When the line was originally laid out in this position it was actually 11° in error, through Ploegsteert church being mistaken for Warneton church. As it turned out, however, the mistake proved to be quite beneficial, as 'Mother' was able to fire where she was most required. 'Mother' remained in this position, near the right section of the 8th Siege Battery, until the end of the month, and thus bore her share in the heavy fighting that marked the culminating stages of the Battles of Ypres, though during this tense period the ammunition seems to have been limited to about 6 rounds a day. The howitzer proved a source of interest to everybody, and she was so precious that at first an infantry guard of twelve men was always mounted over her.

During the night of 12th/13th November, 'Mother's' position was adjusted, so that she could shell Messines and engage the German batteries near Wytschaete. On the 15th December the Howitzer showed signs of being strained in some way. She was promptly dismounted and overhauled. After local repairs she was brought into action again and was able to open fire once more on the 18th December.

The range of Mark I. equipment was 10,000 yards with a shell weighing 290 lbs. In Mark II., with an improved shape of shell, the range was tuned up to 12,700 yards. Perhaps the proof of the soundness of this howitzer's design is shown by the fact that practically no changes were made in it during the war. By November 1918, 512 equipments had been issued, and in France alone the 'Mother' class was delivered of 3,100,000 rounds.

Total landed in France in October 1914 :—

6 Heavy Batteries, and
2 Siege Batteries :

24—4·7″ Q.F. guns; 4—6″ guns; 1—9·2″ gun on railway mounting; and 1—9·2″ howitzer.

The following units landed in France in November, 1914 :—

HEAVY BATTERIES.

118 Heavy Battery (4—4·7″ Q.F. guns).[1]

Formed at Woolwich on 3rd October 1914 as part of the 8th Divisional Artillery, the battery went to France and landed at Havre on 6th November. Moving to the front on 10th November, the guns came into action on the 16th in a position about two miles south of Estaires and to the west of the La Bassée—Estaires road. From here the battery opened fire. It was found on "turfed ground a rate of fire as referred to in drill-books is impossible to attain." The battery remained in action here for the rest of the month.

[1] 117 Heavy Battery did not go to France in 1914, nor was it formed in that year

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119 Heavy Battery (4—4·7″ Q.F. guns).

Formed at Woolwich on 3rd October 1914 as part of the 8th Divisional Artillery, the battery went to France with 118 Heavy Battery, and completed disembarkation at Havre on 7th November. The battery entrained for the front on 10th November and took up a position to the north-west of Laventie during the evening of 15th November. 119 opened fire on Aubers on the 17th. The battery remained in action here until the 26th, when it moved to a fresh position about one and a quarter miles to the north-east of Laventie.

Note. 118 and 119 Heavy Batteries formed VIII. Heavy Brigade, R.G.A.[1]

Total landed in France in November 1914 :—

2 Heavy Batteries : 8—4·7″ Q.F. guns.

* * * * * * * *

Thus up to the end of November 1914, there had been landed in France

16 Heavy Batteries and
8 Siege Batteries,

comprising :—

24—60-pdrs.
40—4·7″ Q.F. guns.
24—6″ B.L. Hows., 30 cwt.
4—6″ guns.
1—9·2″ gun on railway mounting, and
1—9·2″ howitzer,

giving a grand total of :—

94 heavy guns and howitzers of all natures.[2]

Of these[3]

20—60-pdrs.
16—4·7″ Q.F. guns.
16—6″ B.L. howitzers, 30 cwt.
1—6″ gun, and
1—9·2″ howitzer.

Total 54 were engaged in the Battles of Ypres between 19th October and 22nd November, 1914.[4]

[1] Neither 118 nor 119 were in action until the Battles of La Bassée and Armentières were both concluded.

[2] This total does not include the armament of the three Armoured trains—"Churchill," "Jellicoe," and "De Guise"—then in France. Their armament was as follows :—

Churchill 2—6″ guns, 2, 4″ guns, and 1 machine gun.
Jellicoe 3—4·7″ Q.F. guns and 1 machine gun.
De Guise 3—4·7″ Q.F. guns and 1 machine gun.

[3] This number includes 24 Heavy Battery, which was engaged only for part of the time to the north of the Lys.

[4] Whether the 9·2″ gun on railway mounting came into action at all in 1914, and, if so, where it opened fire, have so far not been ascertained from the available records.

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During December 1914, the only other heavy ordnance landed in France were the four 6″ guns to complete the 7th and 8th Siege Batteries. This brought the grand total of heavy guns and howitzers with the B.E.F. in 1914 up to 98.

APPENDIX I.

SUMMARY OF HEAVY AND SIEGE BATTERIES IN FRANCE IN 1914.

MONTH.	HEAVY BATTERIES.	60 Pdrs.	4·7″	SIEGE BATTERIES.	6″ Hows.	6″ Guns.	9·2″ Gun on railway mounting.	9·2″ How.	TOTAL.
AUGUST	4 (26, 35, 48 & 108)[1]	16	—	—	—	—	—	—	16
SEPTEMBER	4 (31, 24, 109, & 110)[1]	8	8	6 (1, 2, 3, 4, 5, & 6)	24	—	—	—	40
OCTOBER	6 (111,[1] 112,[1] 113 114, 115, & 116)	—	24	2 (7 & 8)	—	4	1	1	30
NOVEMBER	2 (118 & 119)[1]	—	8	—	—	—	—	—	8
DECEMBER	—	—	—	—	—	4[2]	—	—	4
		24	40		24	8	1	1	98[3]

GRAND TOTAL OF HEAVY GUNS AND HOWITZERS LANDED IN FRANCE IN 1914 ... 98[3]

[1] Divisional Heavy Batteries.
[2] Two each for Nos. 7 and 8 Siege Batteries.
[3] Excluding spare guns and the Armoured trains.

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APPENDIX II.

The other Heavy and Siege Batteries in existence in 1914—

HEAVY BATTERIES: 71, 72, 86, 90, 91, 104, 121, 122, and 123.

71 Heavy Battery. Formed in 1765 as "A" Coy., 1st Madras Battalion, R.A., it became 71 Heavy Battery in 1908. On the outbreak of war it was quartered at Nowgong.

72 Heavy Battery. Formed in 1771 as No. 1 Coy., 4th Battalion, R.A., it became 72 Heavy Battery in 1908. This battery held a most distinguished record. In the first 50 years of its existence it was present at 59 battles, sieges, engagements, and affairs. Beginning with Bunker's Hill in 1775, No. 1 Company, 4th Battalion, R.A., fought through the Peninsular War, and among other actions it took part in the Battles of Albuera, Vittoria, the Pyrenees, Orthes, and Toulouse. It then served in Canada and thus missed the chance of adding to its laurels at Waterloo. On the outbreak of war 72 Heavy Battery was quartered at Peshawar.

86 Heavy Battery. Formed in 1748 as No. 1 Coy., Bombay Battalion, R.A., it became 86 Heavy Battery in 1908. On the outbreak of war it was quartered at Multan.

90 Heavy Battery. Formed in 1768 as No. 2 Coy., 2nd Bombay Battalion, R.A., it became 90 Heavy Battery in 1908. It was at Nowgong on the outbreak of war.

91 Heavy Battery. Formed in 1802 as No. 4 Coy., 1st Bombay Battalion, R.A., it became 91 Heavy Battery in 1908. It was serving at Rurki when war broke out.

104 Heavy Battery. Formed in 1848 as No. 10 Coy., 5th Battalion, R.A., it was reduced in 1871. In 1901 it was reformed as 32 Coy., Eastern Division, R.A., and became 104 Heavy Battery in 1903. On the outbreak of war it was quartered at Campbellpore.

121, 122 and 123 Heavy Batteries. These batteries were all formed at Woolwich in 1914, after the outbreak of hostilities.

SIEGE BATTERIES: 9, 10, 11, 12, 13, 15, 16, 59, and 81.

Of the foregoing:—

9, 10, 11, and 12 Siege Batteries were all formed at Lydd in 1914 after the declaration of war.

13, 15, and 16 Siege Batteries were also formed in 1914 after hostilities began. They were formed at the following stations:—

13 at Portsmouth,
15 at Sheerness, and
16 at Pembroke Dock.

59 Siege Battery. Formed in 1808 as No. 8 Coy., 10th Battalion, R.A., it was reduced in 1817. Then in 1846 it was reformed as No. 8 Coy., 10th Battalion, R.A., and became 59 Company, R.G.A., in 1902. On the outbreak of war 59 (Siege) Company, R.G.A., was quartered at Rurki. On arrival from India in 1914 it was made into 59 Siege Battery.

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81 Siege Battery. Formed in 1855 as No. 2 Coy., 14th Battalion, R.A. In 1902 it became 81 Company, R.G.A., in 1905 it was 81 Company, Temporary Heavy Battery, in 1909 it ceased to be a Temporary Heavy Battery, and in 1914, at the outbreak of war, it was 81 (Siege) Company, R.G.A., and was quartered at Rurki. Then it became 81 Heavy Battery, R.G.A., and in the same year (1914) it was made into 81 Siege Battery.

None of these 9 heavy batteries or of the 9 siege batteries went to France in 1914.

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SHOOTING AT TANKS FROM COVERED POSITIONS.

BY LIEUT. J. A. SINCLAIR, R.F.A.

AT Yaru Practice Camp, 1922, four field or pack artillery batteries had two or more series firing from covered positions at moving tanks, with an O.P. close enough to the battery for voice control.

The tank moved at least 10 mile p.h. and jinked, but most officers by then knew its run. Although conditions were therefore more favourable than could be expected on service, in not one of these "series" would the tank have been in the least worried.

This lack of effect in my opinion can be put down to three causes.

1. Lack of practice of B.C. and detachments in this type of shoot.
2. Lack of sufficient number of observations to enable the B.C. to know the range with any degree of accuracy.

For a run of 1,500 yards at range of 2,000 the tank moved approximately 40° across the front of the battery. A battery firing Gun Fire every 6°, moving trails between each burst of fire, as the batteries did at Yaru, only obtained 7 observations during which time the tank altered its range variably and by 700 yards.

3. The B.C. had too much to think of, e.g., order a switch, range, and method of fire, measure where his switch took him to, wait for the tank to approach that line, give the order to fire, observe the fall of shot, correct the line and range, give a further switch, and measure where that took him to—surely too much for one man? No. 1 can be removed by practice, but No. 2 is fatal to success.
   We seem therefore to be in the same position as the Navy was when their guns could shoot farther than a target which was just visible from their guns. Their solution was Director firing, and I consider that we too shall have to introduce some instrument to assist the B.C.

The following method for light guns has been discussed and proved by limited practice to be worth a further trial :—

Should a Tank be seen from the O.P. moving from right to left :—

(1). Switch the battery on to a suitable line, and then distribute so that the fall of No. 2 shot will subtend at the battery 1° from the fall of No. 1 shot, etc.

(2). Order "tank method of fire from the right," switch 1°. This order means that each gun fires in turn 1° left of the previous gun, "Firing by Order." With a six-gun battery a gun after firing would switch over 6°.

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(3). The B.C. lays the "gadget" which I shall later describe, on to the line given to the guns, putting on the "gadget" the necessary deflection for movement. He gives out a range.

(4). The B.C's assistant (or someone on the Battery Staff) takes over the "gadget" and, when the tank comes in line, orders "Fire No. 1."

(5). No. 1 is fired on the original line ordered.

(6). The B.C. observes the fall of shot, and orders a deflection to correct for any error in line due to false estimation of the deflection for movement, or of the deflection necessary for the time taken for the order to fire to reach the gun. This deflection is put on the "gadget." He also orders a new range.

(7). The B.C's assistant puts 1° more left on the "gadget," and fires No. 2 as the tank comes on the new line.

(8). Each gun is fired in turn as the tank moves on to the next line. Should the tank be moved from left to right, No. 6 would be put on the line, the remainder being distributed from No. 6, and the guns fired from the left. In the example taken switch 1° was ordered. The switch depends on the time necessary to move the trail. Could the trail be moved in the time taken for the tank to move 3°, "switch 30'" would be ordered. If the O.P. were not near the battery position, the switch put on the guns would have to be proportional to the switch put on the "gadget."

The advantage claimed for this method of engaging tanks from under cover is, that it does away with reasons 2 and 3 mentioned for the failure at Yaru. Firstly, a continual stream of shell falls near the target from which observations can be obtained. In the case quoted, firing with switch 1°, the B.C. would have obtained 40 observations as opposed to the 7 obtained by the previous method. Secondly, the B.C. has only to correct for line and range. A highly skilled B.C's assistant would be required—he can be trained. An accurate and easily worked instrument is required. That can be made.

With these two I can see no reason why moving targets should not be engaged with success by batteries in covered positions. With tanks taking part in future wars, which now seems likely, batteries must be prepared to engage them with some chance of success whatever their position.

The Instrument required could easily be made by Ordnance.

The following would be required :—

(1). A sight similar to that of a rifle and pivoted to allow of movement in a vertical plane.

(2). Free lateral movement of this sight until clamped.

(3). A method similar to No. 7 Dial Sight for putting deflection on the sight—3° either way.

(4). A method of moving the sight exactly 30′ by one revolution of a screw, and capable of moving the sight indefinitely a succession of 30′ switches either right or left.

(5). These three lateral movements to be independent of each other.

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"DUNCAN" SILVER MEDAL ESSAY, 1922-23.

Subject to be chosen by competitor, but it must be a serious discussion of some up to date question connected with R.H. and R.F.A., or it may be a tactical or technical Field Artillery study based on lessons of the Great War.

THE SIMPLIFICATION OF ARTILLERY METHODS.

By MAJOR S. R. WASON, M.C. R.F.A.

"L'homme arrive novice à chaque âge de la vie."

1. The Artillery War.

At dawn on the 20th September, 1917, the period of limited objective attacks culminating in the capture of the Paschendaele Ridge commenced. The covering fire of the artillery consisted of tiers of creeping barrages by the field guns, and bombardments of defences and localities, moving back behind the barrage, by the heavier natures, which gave the screen of covering fire everywhere a depth of at least 1,000 yards. The creeping barrage of the 9th Division front was complicated by innumerable boxes varying from 20 to 200 yards in breadth, where the fire of parts of the barrage was to dwell on strong points to allow the attacking troops to envelope them from the flanks. The details of this barrage, though often slightly altered, were in the main issued several days beforehand. Battery commanders had time and ammunition at their disposal to register by actual shooting the starting line and any other line of their barrage that they could identify. Barrage table forms as an article of stationery were issued, and some battery commanders spent up to twelve hours in preparing them.

During the attack the noise of the firing of the serried lines of guns was terrific. In a field battery it was impossible to keep candles alight on account of the blast of the 60 pdrs. in rear. To explain the simplest message to an orderly it was necessary to shout into his ear from a distance of a few inches. Yet one battery in front of the Cambridge Road had no programmes issued. The line, angle of sight, elevations and method of fire on each successive lift were passed by word of mouth from the command post. This battery had 3,000 rounds or so to fire in two and a half hours. The extent to which they carried out their time-table can be imagined.

There were Australian, Territorial, New Army, Regular and perhaps other batteries on this narrow front.

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This is only one phase of the Artillery War. Others, especially action against the enemy's artillery, were even more complicated in respect of control and technical methods.

2. Comparison of the Imperial Forces with the Army of 1914.

The Expeditionary Force of 1914 consisted of six regular divisions with cavalry and other detachments. Not a very large proportion of the officers of this force had given previous thought to the problems of fighting a big war alongside of territorial or overseas divisions, let alone a war-time enlisted army. In the oft-repeated words of an ex-Secretary of State for War "It was not in accordance with the policy of His Majesty's Government."

Now there are four regular divisions, and it is possible that with economy in view, they may in the future be reduced below the strength at which they could be regarded as forming an efficient Expeditionary Force. There are 14 divisions of the Territorial Army, no longer merely the Territorial Force, and the machinery to expand and duplicate this army in an emergency. Imperial organization and study of the armies of the Dominions and Colonies has been made an important part of the education of the officer. His outlook has not merely been broadened naturally by the experiences of war, but compulsorily by the necessities of peace—and promotion examinations.

3. The evolution of artillery methods.

It is difficult to state concisely the essential differences between the possibilities of artillery fire now and at the beginning of the late war. It can be argued that 1914 found artillery in a very elementary stage as regards the development of indirect fire. The accuracy and destructive effect of modern artillery had driven the batteries behind the crest. So long as fire could be controlled by observation and correction, accurate methods of c lculating line and elevation in indirect fire were not required. The growing distance between attacking units and supporting batteries soon brought about pre-arrangement of artillery fire in the attack. The infantry soon showed a natural preference for attacking under conditions which cramped the increasing fire power of the weapons of defence, even though those conditions at the same time denied observation to the supporting artillery. Consequently, the artillery were forced to find accurate methods of calculating the line and elevation in indirect fire. Artillery tactics at the beginning of the late war, then, present an unstable basis for comparison.

One of the greatest British soldiers has said "the artillery joined the Army in 1914"; perhaps it would then be equally correct to say that the artillery left the Army when it was found that they must hide their batteries behind the hill, and, "out of sight, out of mind"—the *Army* forgot them. One senior officer very early in the war is reputed to have said that he regarded the artillery as non-combatants; another "that nothing did his troops so much good as to see a dead Staff officer carried round their trenches." These remarks may not have been

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made. But they circulated as "bons-mots," and show the way the wind was blowing.

The artillery soon found that the methods they had learnt in time of peace were insufficient. Predicted shooting had not been contemplated in the official regulations. Aerial observation and methods of cross observation were in their infancy. The use of heavy equipments with the field army was so rarely considered that their rôle was left out of the calculation. The expression "counter-battery work" was unfamiliar. The battery commander did not expect to have his target detailed by the brigade commander, much less his ammunition expenditure. Corps control entered into no one's conception of an artillery plan in attack—even if more than a few conceived that there might be such a thing as an artillery plan. Lastly, the idea of the formation of new batteries on the outbreak of war would have been treated with derision by ninety-nine out of every hundred, and the value of Territorial batteries was doubted by many.

The war provided many examples of what can be done, and pointed the way to the possibilities of the future. It has shown much that can be discarded, but for every item that can be dispensed with, at least six new and absolutely necessary features appear.

Observation of fire, correction of fire, a new fire discipline, calculation of fire, calculation of an accurate line of fire, counter-battery work, communications, varying tactics with different equipments, varying situations in command, together present a sum total far in excess of the highest ideal of 1914.

4. The necessity for simplification.

Last training season most regular brigades went to practice camp for a fortnight only in place of the minimum pre-war period of three weeks. They consisted of four as against three batteries, and had a greater allowance of ammunition. It has always been pointed out that the range of subjects included in their training has broadened enormously. The difficulty was to do the sum—to cover the ground in the time. It could not be expected that the standard would be very high. Most batteries had only just emerged from the "Royal Artillery Mounted Rifles" period, and some did almost their first drill order on their first day of practice. The results obtained, however, showed very great promise and gave much encouragement. And in this lies a danger—these batteries cannot be allowed to set the standard that *must* be reached.

The case in a territorial brigade is different. A large proportion of their officers and senior N.C.O's have considerable war experience. This must be set against the difficulties of the first post-war training. The standard may be expected to rise for a few years but after that it must be expected to fall again as the experienced personnel is lost. At present, the best territorial army batteries reach the same standard in observed shooting as the average of the regular batteries. In all other departments, however, of shooting alone, they are inevitably far behind. In shooting with aeroplane observation, predicted shoot-

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ing and its concomitants, care of equipment and sight-testing, as well as in all tactical training, they are far behind. They find the present training instructions too difficult for them.

Most regular officers feel altogether differently in regard to the Territorial Army since the war. But those having recent experience with Territorial formations realise that their difficulties are greater than ever. If their peace training cannot suffice to make these formations efficient for war, it is all the more necessary that all ranks should feel that their training starts them on the right road, and is not merely a rather poor way of spending perhaps their only holidays of the year. Anyone who has watched their struggles with the wretched teams collected for their training must hope that their patience and energy are not wasted.

Mechanicalisation will double the value of their yearly training, and this is a most urgent reason for its earliest possible application. At present the horses of Territorial batteries absorb more than half their time and energy. But even then they will not have time to read learn and put into practice some 1100 pages of Artillery Training and leave time over for Field Service Regulations. Also, if the training period of these brigades cannot be increased, they cannot practise every year without entirely losing touch with the infantry of their division. Again, the difficulty is to do the sum, to make the best use of the part time spared by our patriotic Territorial Army, and to make the same instructions intelligible in interpretation and feasible in practice for the batteries and brigades of the Dominion forces. In the war against which the Empire insures—and for which its army prepares—regular batteries would be outnumbered by five to one. This is not to say that a high standard must not be aimed at, or to disparage the work of the Territorial batteries. It is only by placing modern artillery methods on the broadest basis of mutual understanding, the outcome of simplicity in training and equipment, that the possibilities of these methods can ever be realised whether the army under consideration be regular or territorial.

There is another argument for simplicity which applies to the regular soldier as much as to the part-timer. Tactics as a result of mechanicalisation, of the possibilities of the air, of chemical warfare and of scientific inventions and improvements in such matters as wireless, change so quickly that rigid tactics for any arm would be fatal. But the principles do not change, and if these simple principles are kept in the foreground and not allowed to be hidden by the technicalities of methods of the moment, it is easy to exchange these technicalities for others as they come into the market.

5. The development of a theory of artillery tactics.

The three volumes of Artillery Training are in the sequence, Drill, Gunnery, Employment in War; this is the sequence at present followed in progressive training. But as a starting point for a theory of artillery tactics the order must be reversed. Artillery tactics, that is employ-

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ment of artillery in combination with the other arms, that is, co-operation must be the first foundation of the building.

After the late war all armies were faced with the necessity of evolving a crystallized conception of the tactics of all arms in attack and defence. Many new arms and methods had appeared and proved their value according to circumstances. It was necessary to weigh the probable circumstances of a future war before deciding to abandon for example, such things as trench mortars as part of the artillery of a division, or a special chemical warfare detachment of sappers. The British Army was probably placed in greater difficulty than that of any continental power. Most of the latter prepare for war on one or other of their frontiers and adapt their methods accordingly. The British Army must be prepared to fight in any part of the world. The populations of the continental powers are for the most part accustomed to, and more or less acquiesce in, some form of compulsory service. This country's popular press has encouraged its population in their inherent antipathy to anything military, and has given the word "militarism" the significance of a most hateful oppression—chiefly for political use. The people have been blinded to the fact that they must be prepared to defend the position of their country, which is its very life. The Empire then is uniquely placed in that, after its necessarily small and scattered regular forces, its military resources consist of equally scattered formations of very limited training—and not many of them at that. The upholders of the regular army may lose sight of the difficulty of training a national or imperial army on instructions that may be eminently suitable for a long service army of highly trained specialists.

Now, as a groundwork of training of both armies "co-operation" stands alone. It may well be said to be the most important principle of war—increasingly so with the complications of the modern battle. When the commander had all his forces marshalled literally under his own eyes, co-operation took a different form, and must surely have been far easier of attainment than now.

In the modern battle the forces actually co-operating may consist of the attacking infantry, disposed over a depth of 5,000 yards, the guns in action and moving forward in support over a depth of 10,000 yards, and bombing squadrons starting 25 miles away. Here it is not out of place to notice that whereas the tendency in infantry tactics has been towards decentralisation, putting a wider responsibility on the most junior commander, in artillery the opposite tendency has appeared. This is the result of the flight of the gun from observation: it must hide if it is to escape destruction, and its horses must be hidden if mobility is to be retained. Also artillery control must be centralised if the wide range of each battery in action is to be made use of. Yet the gun must be ready to support the individual section of infantry in the attack.

Most of the principles of war as stated in Field Service Regulations concern the education of the officer rather than the training of

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the unit. Co-operation, however, is a matter both for collective training and for the training of every individual, and before all others lends itself to realistic application in peace-time training. At the 1913 manœuvres a keen subaltern was sent with his section to a certain hill to shell a village which the infantry were to attack. He signalled back to his battery commander "cannot see village," and got the answer "fire the village signal." But the sender knew he was wrong. No amount of firing of "infantry signals" at manœuvres could produce good co-operation in war.

The logical sequence of the steps evolving a conception of the tactics of all arms in co-operation is as follows:—first that each arm should consider its own intrinsic needs and possibilities in various situations in modern war; second, that they should discuss together freely how those needs can be provided for, and those possibilities furthered, by co-operation, abandoning any methods which do not lend themselves to co-operation; third, that the simplest theory of combined tactics should be built on the methods thus chosen as lending themselves to co-operation, and that this theory should be taken as the basis of training.

The present danger, however, is that the various arms, and especially the Royal Artillery, may develop their tactics, and hence their training, without due consideration of the question of co-operation in a national as distinct from a professonal army. The incorporation of the technical artillery developments of the late war into a training instruction of the simplicity required for the training of the artillery of a Territorial Army and of Overseas Forces, requires much thought, discussion and experiment. Such a training instruction must have mechanicalisation ever in view. It must beware of the temptation to make the necessary standard very high which is inevitable in a long service regular army. But above all it must realise that the tactics of the whole must dictate the tactics of each part.

Perhaps in some degree a change of outlook is required. In the present training of artillery the successful observed shoot is too often held up as the highest aim. This has grown out of the days when the guns were in action close to their infantry, first in the open and later behind a crest from which the enemy could be seen. The situation is now changed. From now onwards the batteries may be expected to be far from the infantry they support; yet the support of those infantry is the reason for their presence on the battlefield. Co-operation must be studied as never before. As those same infantry will usually attack, and conversely will often be attacked, during hours when observation of fire is impossible, the first aim of artillery methods must be to bring fire to bear on such targets as the infantry may require, regardless of conditions. If such fire can be observed so much the better. But to achieve this purpose knowledge of the shooting power of the guns, sight-testing, accurate calculation of fire, and a correct drill for programme shooting, as well as for shoots with aerial observations will, generally speaking, be more valuable than the highest standard of observed shooting. It is often said that the perfecting of

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the links that go to make the successful observed shoot—good orders, good communications and good drill—is the best basis for all shooting; but the time taken to learn in this school is prohibitive for a national army.

The highest aim of modern artillery is always to be in action, always ready to support their infantry with the most accurate fire possible, whether predicted or observed from the ground or from the air. This involves such matters as consideration of calibration and survey work, and the systematic scrutiny of results by the officer, training of the man in counter-aircraft and anti-gas measures, rigid discipline on the march and in action to avoid exposure to fire, and continual hard work for all to minimise casualties.

Such a changed view point might lower the standard of shooting at a practice camp. But it would not prejudice observed shooting in war and would continually remind the gunner of the true basis of his methods, ready support of his infantry. Similarly, it would make artillery tactics clear to the infantryman.

6. Objects and possibilities.

The term "artillery methods" is used here with a very wide significance. Not only are all the ramifications of artillery training and artillery tactics considered, with the essential liaison with the other arms, its drills, gunnery (better called "shooting") and employment in war, but equipment, transport and ammunition supply are too closely related to the other subjects to be left out.

First of all, the part that artillery must play in its duty to the rifles of the firing line it assists, must influence all its methods. But it is not enough that that duty should be recognised. Artillery must make sure that its methods are easily demonstrable to other arms. Its tactics must fit in with their needs; its technical terminology must be intelligible to all in order that they may appreciate the possibilities of its fire.

In regard to the question of equipment the difficulty of repeatedly replacing obsolete or obsolescent equipment in peace time has always been fully realised. Immediate replacement is often out of the question; the equipment of the Royal Horse Artillery and the necessity for special anti-tank equipments are obvious cases in point. So long, however, as the tactics of all arms in co-operation are not allowed to form themselves on the failings of obsolete weapons no great harm is done. Only it must be acknowledged openly when an equipment becomes out-of-date or unsuitable. Officers of other arms have sometimes watched anti-tank shooting by the 18-pr. gun on the practice ground, and have been allowed to go away with the idea that this is the official answer to the problem of anti-tank defence.

The question of provision of suitable transport for the large quantities of ammunition required will always be most important. Ease of service of ammunition in action points to a special type of ammunition carriage for each equipment; but the approach of mechanicalisation and the value that such transport might have for other purposes

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than to carry one type of ammunition, indicates the introduction of a type of packing which will enable ammunition to be carried with the minimum amount of handling from the base to the gun in action. The basket-work carriers used for the German field gun ammunition are an illustration.

In drill, the first necessity is to keep an eye on essentials, and to refuse to fall to the temptation of appearances; the intrinsic value in war of every method must be the first guide. The value of drill is that it ensures automatic compliance with orders in the heat of the moment without the delay caused by special instructions.

If drill becomes complicated so that this automatic action is jeopardised, its value as such is entirely lost; it becomes a snare and a delusion. Exercise in those drills which are necessary in war is quite sufficient to instil the moral value of drill, producing as it does the steadiness and mutual trust which are the outstanding attribute of well-trained troops.

In tactics perhaps the greatest need is that all arms should speak the same language. Without this it is impossible for them to understand each other. Employment in war is perhaps a better term than tactics, in that it more obviously embraces the important questions of command and mutual information.

The nature of artillery support required has undergone a complete revolution during the last nine years. Pre-arranged fire, which must nearly always be predicted, has taken the place of nine-tenths of the impromptu observed shooting which was the only nature of artillery fire legislated for by the pre-war training manuals. The experiences of recent practice camps have given a guide to the accuracy that can be expected, and to the time taken to organise such artillery support. The methods employed have had the advantage of a trial with both Regular and Territorial Army batteries, though subsequent trainings will inevitably expose obstacles to success as well as improvements and increased possibilities.

The organization of predicted fire in support of a pre-arranged attack can be undertaken with a guarantee of a degree of accuracy which can be stated, depending on the time available, state of training of personnel, and conditions, including the scale and accuracy of available maps. Shooting by the result of previous registrations can always be arranged in a very short time so long as the targets can be allotted and pointed out on the ground. As an example, at a practice camp targets were allotted, battery positions chosen, guns moved up two miles into action, targets registered and all other preparations made in under an hour and a half. The time required in every case is easily calculable and depends entirely on the facility for pointing out and observing fire on the targets allotted, and the time required to gets the guns into action. This method is independent of maps and can be carried out whenever targets can be located and fire observed. The accuracy of the predicted fire depends on the facility for observation, and decreases as the interval of time between the registration and the predicted shoot grows longer.

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The situations in which predicted shooting without previous registration cannot be carried out, will be rare; but the expectation of accuracy, which can always be stated, will vary much with conditions, and will often turn the scale against the employment of this form of artillery attack. Large scale maps are in no way necessary. Information as to the fixing of gun positions and targets can be supplied by Survey Company personnel, if available, in time varying of course with the conditions, but if possible at all, probably within three hours.

These possibilities are increased daily by the spread of knowledge of survey methods; too much, however, must not be expected from schemes which for their operation require a highly trained and specialised personnel. It is also unlikely that many survey units will be available owing to the natural disinclination to reduce the proportion of rifles in the firing line to feeding strength by the provision of such units. But much may be expected from survey methods carried out by regimental officers, as training in their use gradually becomes part of the education of the officer.

The greatest difficulty is always at the target end. It is often impossible to fix on the map the defences held by the enemy. It is again often difficult to locate them, that is, to know what points the enemy are actually occupying. But these difficulties are for the commander rather than the subordinate artillery officers, whose business it is to arrange how best to calculate the line and elevation to be given to the guns. On the circumstances of each case must rest the decision of the nature of the artillery support to be provided, whether by moving barrages or a timed bombardment of localities likely to be held by the enemy.

The following is an instance of the organisation of this type of covering fire actually carried out. The commander of a force was faced with the necessity of attacking a reverse slope position. Only 1″ maps were available and there was no time for aeroplane photography. Registration with aeroplane observation was undesirable in that it would have disclosed the intentions of the commander. The Survey Company personnel (1 officer and 1 orderly) fixed certain points on the crest, and the barrage and infantry starting lines were settled by the commander with reference to these points, and not with reference to the enemy defences which could not be located. This line was described to the batteries by 1/20,000 tracings, and alternatively by co-ordinates. The organization of these barrages from the time the commander made his plans took three and a half hours; familiarity with the methods would have reduced this time. The accuracy of the barrage was remarkable.

The conditions of observed shooting also have changed. The observer will in future tend to be much nearer the target and much further from the battery than before the war. When wireless development has become sufficiently stable to allow equipment to be issued without the certainty of its immediately becoming out of date, communications will be greatly simplified. Artillery observers must be taught methods of bringing fire to bear on targets and areas without

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the necessity of sending many orders, which causes delay, while at the same time retaining control of fire. Granted efficient communication, however slow, the observer should be confident of bringing effective fire to bear on a dispersed target under any but very difficult circumstances within four minutes.

There is another great change in the tactics of observed fire. Observers will in future be used to put other batteries besides their own on to targets that appear, and will be able to observe for any battery of any nature that may be detailed to engage a target reported. In fact, it will probably become the rule in certain types of warfare to send out observing parties for two or more batteries linked together, for a brigade or even a group of larger size. Eventually, artillery fire may be observed by officers of other arms on targets which they themselves report.

The enormous asset of aerial observation, from which nothing can hide, has reinforced the facility of correction of artillery fire to such an extent as to revolutionise the action of artillery, at all events of heavier natures. The process of ranging on targets has been considerably quickened, and sufficiently accurate ranging should be carried out in 15-20 minutes to guarantee effective neutralising fire immediately or when required.

Engagement of targets with aerial observation is developing on the lines of impromptu shoots for neutralisation and destruction, and of pre-arranged shoots for registration. In the case of impromptu shoots the nature of the target and its importance is described by the code letters of the call sent. These calls may increase in number but by careful avoidance of differences in procedure, complication may be avoided. If, as seems likely, these calls are allowed to be used to describe targets seen from the ground observation posts also, they will lose their present unfamiliarity. Calls from the air can quite easily be picked up by a wireless tender moving with a mobile unit; the guns can be brought into action, and the call answered with fire within a short time—easily within ten minutes. In some types of warfare, such as an advance or retirement when in touch with the enemy, it may be more convenient to put successive sections or batteries into action to take such calls.

Cross observation methods were practised before the war, but their development has been considerable. Cross observation by battery personnel has made headway, and it is probable that by organization within brigades or groups, as used continually in Mesopotamia, in conjunction with aerial observation it will become the normal counter battery method in moving warfare. Until the question of provision of the required technical personnel is settled, cross observation by artillery survey units cannot be reckoned on. Organisation by regimental personnel can effect much, even if technical personnel are not available to assist. The case of a horse artillery battery improvising cross observation on a flash battery at a practice camp by sending out a flank party with a group of signallers, and reaching effective fire within twenty minutes or so from the appearance of the

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target, shows the applicability of such methods in the quickest moving warfare.

The above recitation of the possibilities of modern artillery fire cannot fail to produce a sense of heaviness, and a feeling that reduction to the standard of simplicity, stated to be necessary, is impossible. It must be *made* possible. And if every method is looked on from the point of view of facility of co-operation, and those which do not lend themselves thereto are cut out or at events made subsidiary and not principal, then an intelligible formula can be reached. But it will be at the expense of abandoning many practices which, with the licence of ages behind them, will die hard.

7. Means of simplification.

It is a favourite Communist theory that the evils from which the world suffers are due to the fact that our so-called civilization has grown up on a wrong basis—the necessity for Capital on the one side, and Labour on the other. The Communist plan is to destroy the whole system and begin again. But the country that tried it starves.

An army might like to begin again too. A logical basis of territorialization; barracks well distributed to make the army popular, and at the same time to make training easy; an end to a lot of inherited misleading terms—for example, "fire discipline"; perhaps an end to the system and hours of work that get the soldier into indifferent habits, and the ex-soldier a bad name in civilian life; new up-to-date equipments. But just as a social system cannot be evolved in a day, so an army can rarely be reorganised from top to bottom by a stroke of a pen. The British Army with the forces of the Dominions, scattered round the globe and usually at war somewhere, is at a greater disadvantage in this way than its neighbours. Again, in looking ahead, the needs and dangers of the present and immediate future must not be forgotten. There is no panacea to all the ills of the artillery. Even the necessary step of amalgamation of the two branches of the regiment will bring its problems.

The Geddes Committee pointed out that no great reduction in expenditure could be effected without attacking every spending department. Similarly no real simplification of artillery methods is possible except on a detailed survey of them all—and with as bold a disregard for vested interests as was displayed by the apostles of the axe.

A. *Equipment.*

This is the department above all others in which simplification of details has always been kept in mind; maintenance instructions and the form of range tables are good examples. But there remain many other things to which standardisation might be applied. Accurate calculation of fire is completely dependent on sight-testing, the instructions for which vary with each equipment and almost from day to day. There are at least three ways each of compensating for drift and of adding gun corrections, and a still greater variety of means of control of recoil and run up. In any case some automatic appliance for making the guns of a battery shoot together is absolutely necessary.

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It is unthinkable that equipments should again take the field without a compensating sight. At worst "gun rules" can be supplied pending the introduction of a sight to overcome the difficulties of multiple charges and shells of different calibre radius head. This means of adjustment of elevation must take up all the differences in shooting power between individual guns—at present ascribed for convenience to muzzle velocity. The anomaly of ordering elevations in yards when, owing to various reasons, the figure to hit a target does not correspond with the actual distance, has caused many to advocate the ordering of all elevations in degrees and minutes or in minutes only. It is undeniable, however, that this does cause slowness in most battery commanders' minds at the critical moment of ordering the elevation: for the sake of the extra speed in cases where speed is everything, it is certainly better to retain the false yards as the unit of elevation in the field gun, and it would be worth applying it to all equipments. This would help greatly towards removing the bogey of the difficulty of shooting different equipments.

Shrapnel is a very valuable type of shell, and especially so against targets in the open; in war such targets are always of a fleeting nature. It should never occur again that shrapnel-firing equipments should either take the field or even carry out their training without fuze bar indicators in metal properly graduated; the issue of paper strips is a stigma on the capacity of the nation's workshops. If shrapnel is to be used for predicted fire, figures for calculation of corrector must be provided as a matter of course however much ammunition must be fired on the practice ground to evolve them.

B. *Tactics.*

The basis of successful co-operation is mutual understanding. The artillery must be brought into the closest touch with the other arms with which they will have to fight in order that each may understand the other's methods. The other arms must be brought to see that the work of the artillery is not abstruse but easily within their grasp. Until the various arms reach this state of mutual understanding the commander of a mixed force cannot hope to be able to make the best use of its various components.

The first step to be taken is that all should speak the same language. Technical expressions are always confusing. A writer on infantry tactics in a military magazine urged that the term "supports" should be done away with since to support a "firing line" that was immobilised, was to support failure, was therefore wrong and contrary to current infantry tactics. He pleaded for a self-explanatory nomenclature in preference to a directly misleading one. The artillery in the field have accumulated many such expressions. Compare the terms "position of observation" and "position in readiness." "Position" from the artillery point of view means guns in action as in "a position in the open," "a semi-covered position." But a "position in readiness" is used to describe the guns limbered up under cover and close to a reconnoitred gun position. Whenever possible terms

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should explain themselves. For "to occupy positions of observation" the expression "to occupy silent positions" might be substituted. To "concentrations" merely add "of fire" or "of the fire of several batteries."

Field Service Regulations and Artillery Training, Volume III, have perpetuated many expressions used during the war; barrage, bombardment, harassing fire, concentrations, counter battery work, neutralisation. So long as these terms have commonly understood meanings, they might conceivably be worth retaining even if they were not self-explanatory. But a distinguished general wrote "this form of bombardment which is known as the barrage." Artillery Training, Volume III, says "enfilade fire may be used in connection with covering fire by (timed) programme, barrages, bombardments of all kinds, and counter battery work, and is of particular value in harassing fire . . . . as its moral effect is great." The situations enumerated cover almost the entire field of the uses of artillery fire, and it is rather invidious to leave out the others. These extracts should be sufficient to show that the respective writers did not attach a definite meaning to the words they used. How is, for example, an Australian battery commander in five years' time to be able to appreciate their meanings? The following definitions of the various natures of artillery fire are suggested :—

Bombardment. Pre-arranged artillery fire for the purpose either of destruction of material or of inflicting casualties. It may be observed fire but more frequently it will be predicted.

A Barrage. A curtain of covering fire. It is always pre-arranged. A creeping barrage is a curtain of fire which rolls over an area occupied by the enemy and is designed to provide covering fire for the infantry advancing to the attack.

Harassing Fire. The term used to express the programme of pre-arranged fire on the enemy's communications and positions, for the purpose of causing casualties, lowering his morale and rendering as difficult as possible his services of supply, communication and transport.

Registration. Shooting to obtain information, such as the engagement of a target in order to make records of ranges and angles, so that the target may be re-engaged at other times without observation.

Observed shooting for effect. Includes artillery fire observed from the ground, from an aeroplane, or by any other means. It may be undertaken to inflict casualties or to destroy material.

If some such definitions were agreed to, the use of each would convey the same meaning to the infantry as to the gunner. It is interesting to note that in internal matters this process of substituting self-explanatory terms has been going on for a long time. In 1908 "rapid fire" became "gun fire," and "gun fire" became "battery fire"; in Artillery Training, Vol. II, the confusing term "method of

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fire" became "method of fire for effect." Again such misleading terms as "protective barrage" should be taboo. The analogy of the boxer is not always a good one, but in so far as he can parry a blow as well as strike, it applies also to an army as a whole. Artillery fire on the other hand is always offensive, and to consider it as defensive in any way is to create a false impression.

The second necessity if infantry and artillery are to act together without friction or delay, is simplicity of organization and system of command. The commander of any force must have only one artillery commander to deal with; remembering that besides an R.E. commander, he probably also gives orders to a tank commander and possibly others. This demands a high standard of understanding on the part of the Commander of the uses of the various arms, and on the side of the subordinate commander of the part he must play. The latter must be ready to help the commander to form his plan, and after that he must be able to use every method at his command to help to carry out the Commander's orders.

The artillery commander may only have field guns and howitzers under his command; as the size of the formation increases he may have special counter battery artillery, anti-aircraft guns, long range batteries and possibly artillery survey units. If he is to utilise all these to further the plan made by the Commander of the force he must understand them. In order that he may understand them their functions must be capable of simple description, and their tactics must be definite and not controversial. He can neither advise the Commander of the force as to the help that may be expected, nor give the forces under his command the requisite information and orders unless he understands their possibilities and limitations. A complicated organisation with, for example, separate counter battery and intelligence branches is opposed immediately to the important principle of economy of force, and does not admit of the opportunism which is the spirit of successful war, and by which alone time, the first enemy of the Commander of large forces on the modern battlefield, can be annihilated. "Ask me for anything but time" is more applicable now than in Napoleon's day.

Another necessary condition for co-operation is that the equipments and ammunition should be most carefully designed for the requirements of the units whose movements they will cover. The cases of the 13 pdr. and 1914 pack artillery equipment are good examples of neglect of this rule. Unless the uses of the guns are clearly intelligible to the infantry how can the Commander, usually an infantryman, make the best use of them? And if they are not well adapted for their purpose, co-operation suffers.

The provision and use of various types of ammunition for each equipment is a tactical matter of which the question of the ammunition for the field gun is a pertinent example. Pass shrapnel and H.E. (with instantaneous fuze) barrages over a formation of infantry in the open; even at a long range with a badly chosen fuze the shrapnel

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does most damage. But if prediction of fuze is so uncertain as to be almost impossible, and if predicted shooting in support of an attack is to be the rule, shrapnel must be discarded in spite of its admirable effects under conditions that suit it. This expectation of prediction of corrector is such an important question that too much time and labour cannot be spent in experiment on it. If a solution can be found the most effective shell in the service will be saved; if not it must go. Each additional type of shell complicates the shooting of the guns as well as the supply of ammunition. The claims of a H.E. shell bounced and bursting in the air must be considered. After all, in every case, both of equipment and ammunition, it is the feelings of the man at the business end—at or near the target—that should rule the choice.

The principle of co-operation with the infantry can easily be made the starting point of the training of the gunner and the junior officer. It proves the truest foundation, and by stimulating genuine interest from the commencement, it makes training an interest and not a labour. The ground work may well be such situations as that depicted in the plate in "Platoon Training" representing an attack on a farm. With the help of large pictures on the wall of a gun park, and perhaps a blackboard, the part that the gun plays can be shown; then gradually the theory of indirect laying and of calculation of fire. This is a more interesting way of teaching the meaning of such expressions as "angle of sight" and "aiming point" than cold figures and lifeless diagrams. After all it is only the extension of the same idea as incorporating a description of the target into the sequence of orders. Other tactical pictures can be produced to show the use of the muzzle velocity corrector, of the gun rule, and the necessity for the zero line.

Only too often the education of the junior officer in shooting his guns begins wrongly. He learns to do accurate ranging on a trench on a forward slope, and then to do quick observed shooting at a target standing still in the open. But if there were infantry near, whose work could be watched, he would learn that they do not dig their trenches where the enemy observers can see them. If he could hear their tactical discussions he would soon realise that they do not often attack over open ground in broad daylight, and that the long hours he spent on the miniature range wouldn't help them very much. And if he watched one of their attacks or retirements across open ground, he would realise that they present quite different targets to anything that can be produced at a practice camp, and consequently require different treatment to that usually meted out to canvas "jumpers" pulled by a wire from a splinterproof. A battalion commander and an artillery brigade commander in India obtained good results from combined exercises by always putting the artillery with the skeleton force. The infantry commander laid stress on every attack being made against real men; canvas trenches in training teach a false lesson, since the first difficulty in war is to locate the enemy.

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Combined training then is most important. In principle, and where possible in fact, it should be the rule, not the exception. Now it is the exception and not the rule.

C. Drill.

In order to produce that automatic response which is its first reason, drill must be a certainty. Looking back at the varying conditions of training to be expected in an Imperial Army it must therefore be clear that drill has to be shorn of all inessentials. The necessary drills in their simplest form, always performed with a smartness which may well be allowed to become a fetish, are enough to induce the second great effect of drill—confidence of each man in his companion. There is no place for brigade mounted drill in modern training for war. The drill of manœuvre must be kept specially simple, since the opportunities for its exercise are limited.

Power of manœuvre gave armies in the past an overwhelming advantage that guaranteed success; historic examples are the armies of the Romans and of Frederick the Great. Mechanicalisation may well enhance the importance of manœuvre; if it does so, it will undoubtedly make the simplification of manœuvre more than ever necessary.

In F.A.T. 1914 there were five drills for the move out of action; now there is one drill, and modifications required are dealt with by orders given by the battery commander to his officers. Any tendency to elaborate these procedures must be resisted. In the reconnaissance and move into action, also, complication such as the introduction of two or more rigid procedures must be carefully avoided. This again is a case where special conditions must be legislated for by the orders of the officers responsible guided by their common sense.

Continual attempts to simplify gun drills and fire discipline have had good results. Here the importance of rigid drill is so great as to make the necessity for all possible simplicity clear to all.

Communications are the very life of artillery support in the field. Their importance grows with the increasing distance between the guns, the infantry supported, and the target. Every effort must be made to keep signalling "drills" and procedures as simple as possible. The learning of the technicalities of the methods in use is sufficient without adding to the burden. Unless the value of the semaphore code in war can be proved, it should be abandoned. The necessity for complicated "procedures" and memorisation of codes must be reduced.

D. Shooting.

It is probably in this connection that a change of outlook would have the greatest effect. Since a great part of artillery fire in war must necessarily be unobserved, the incorporation of the appropriate methods into the training of the battery becomes most important. It is true that the question of calculation of fire affects the officer more directly than the detachments, but the drill of the programme shoot, the use of the zero line, the importance of careful sight testing, of suitable methods of laying for line, and of correct setting of muzzle

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velocity and other scales, all affect the detachments directly, and the first aim of their training must be to inculcate a realisation of the importance of these matters. The drill of the aeroplane shoot and of the shoot with cross observation need continual practice; speed and exactitude of drill are undeniably more important in these cases than in observed shooting. Fire discipline and gun drill must be mechanical but must be something more. The more they are based on understanding, the more reliable will they prove under the strain of service conditions. The standard reached in many batteries, especially in the Territorial Army, is achieved by specialisation. The result is a shortage of layers and fuze setters on emergency even at camp—a debacle when the No. 1 is fallen out to do section commander—and devastating delays when the simplest mishap occurs. The respective uses of the various methods of laying guns for line must be thoroughly understood by all as also the nature of a target record and its use.

Nevertheless it is for the sake of the officer primarily that shooting must be simplified. Before the war it was the opinion of more than one instructor in gunnery that the shooting of a six-gun Q.F. field battery was too difficult for most battery commanders, and it was the expressed opinion of one cavalry general whose opinions are of real value, that the pre-war battery commander was very bad at shooting his guns. If observed shooting is so difficult and yet is only one small part of the shooting batteries will do in war, the case for its simplification at all costs is proved. As already stated, observed shooting must also have a wider scope than in 1914. Officers must be prepared to shoot batteries of other natures of artillery than their own without definite knowledge of the comparative positions of target, battery and observation post. They must be practised in methods of indicating the positions of targets and of sending observations of fire, as well as of correcting the fire of the battery, when through lack of continuous control the sending of many orders is impossible. The only way to reduce observed shooting to the necessary simplicity is to teach a limited number of ways of engaging different types of targets. Probably four types only are needed: the broad standing target such as a trench, the narrow standing target such as a house, the moving target such as attacking infantry, the indefinite target such as the systematic search of an area after ranging on any part of it that can be seen—applicable to such targets as a wood, a flash battery, or a hollow where troops might collect hidden by a crest which can be seen. Simplicity in each type of shoot would add to efficiency; there is no greater hindrance to quick shooting than the number of unnecessary orders given by most battery commanders.

The processes of ranging a battery on the indications afforded by the observations of the aeroplane observer and by methods of cross observation already show a tendency towards simplification. The tactical uses of these natures of observation, and the technical methods of correction and control of fire must be gradually be brought into line with those employed in shooting with ground observation. Where

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necessary the methods of the latter must be modified to assist in this unification. As an example, the case of the use of a ranging point might be cited. Using aeroplane or cross observations, guns are always concentrated, ranged as far as necessary on a single definite point, and distributed before firing for effect. This might be applied with little, if any, loss of efficiency to shooting with ground observation.

The gradual elimination of special procedures would simplify the teaching of the use of the various methods and increase their correct and timely application. The use of high air bursts is altogether in its infancy, and improved instruments and fuzes might bring these methods into much prominence.

The simplification of the predicted shoot would be brought about in part by a change in outlook and in part by an improvement in equipment. As regards the latter, the application of the principle of a compensating sight to every equipment would do away with a great deal of the complication of calculation of elevation. Fuze bar indicators for all shrapnel firing guns, reciprocating sights to deal automatically with difference of level of wheels and a device to compensate as accurately as possible for drift are also necessary adjuncts. The easiest way to teach the theories of calibration and the use of the range table to calculate elevation is always to look upon the one as the counterpart of the other. The uses of datum and witness points as aids to accurate calculation of elevation could and should be consolidated into one method. If the theory and practice of the zero line were made, in company with the calculation of line, the starting point of technical training, accurate methods of calculation of line would lose their terrors.

There are two mutually antagonistic methods of formulating technical instructions. The first is to lay down principles and to explain them and leave the regimental officer to apply them. The second is to lay down rules. Now there is no more estimable quality in the "noble animal" than that quick decision that makes up his mind—and his rider's—on approaching a big, thick fence. The majority would be glad to have their minds made up for them more often. In shooting a battery the rules of ranging make up the battery commander's mind for him continually, and there is no reason why this principle should not be widely applied. This is a very different matter to teaching officers methods as opposed to principles in the realm of tactics.

8. Conclusion.

The multiplication of artillery methods in a long war with pauses and even leisure to allow of their development, the conviction that the Empire may again have to fight as a whole for its existence, and the cramping limits of peace-time training are the arguments for a simplification of artillery methods. The field of artillery enterprise has grown—like a vigorous rose-tree it has put out more shoots than it can maintain efficiently; careful pruning will produce more flowers.

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The technicalities of artillery methods have outgrown the tactics of which they are the counterpart. The next war may or may not be an artillery war; it is most unlikely to be a replica of the Artillery War of 1914-1918.

Artillery methods in all departments have grown too top-heavy for peace-time training. The lack of any definite artillery tactics, lost in the intricacies of tens of hundreds of pages of official manuals, hampers co-operation in training and in war. Definite tactics are the first requirement, and the second is, that of the wide growths of artillery methods the most suitable shall be kept—like the best wood of the rose tree—when the others are cut away. Field Service Regulations points out the simplicity of the principles of war; complications are not real but are born in the imagination. Yet the application of these principles in battle is most difficult. So it must be with artillery methods and tactics. They must be reduced to the simplest terms if they are to be capable of being correctly applied in battle. If they become complicated they are wrongly conceived. All technical improvements must be utilised and welded on to equipments and methods, but they must remain subordinate to the tactics which define their value and guide their development.

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SURPRISE.

By MAJOR-GENERAL SIR W. E. IRONSIDE, K.C.B., C.M.G., D.S.O.

THE soldier is often accused of being surprised in each new war which comes along. It is said that he slavishly copies the methods of the last war, without taking account of the advance of science. And yet, science just as often falls behind the soldier and fails to supply his needs. There are many common instances of this within the knowledge of all. The enemy can still pick up a wireless message not intended for his ears, and the air is jammed so that messages cannot be properly received. Gas cannot be loaded in shells for long periods in peace, so that large and necessary stocks cannot be prepared beforehand. The demands of the soldier upon science are often far from fulfilled, even if it is true that he fails to call in science sufficiently to aid him in his trade.

War is a trade that cannot be properly practised in peace-time. Results of new inventions are always a matter of conjecture, which cannot be tested without trial and error against the human body, and so it is not unnatural that soldiers are surprised. Wars are, thank goodness, of infrequent occurrence, and of the participants there are few who have actual experience. The German Army of 1914 had no experience in war. However great a personal experience of war may be, it cannot bear comparison with the experience of others. This experience of others can only be absorbed by patient analytic study, and in this the German Army was eminently successful. One can only do one's best to guard against surprise in a future war, one cannot eliminate the chance of it altogether. The wiseacres of the armchair will always have their chance of saying "I told you so."

A blow struck unexpectedly or in some unaccustomed way is always difficult to parry. A man surprised is half-defeated. Napoleon has told us that a good general will always do the unexpected. He avoids the obvious. Clausewitz agrees, but he qualifies his remarks by saying that the effect of surprise is merely transitory and that it cannot avail against numbers. What good can it be in fact for one man to surprise a battalion or a company? If they know anything of war they will soon recover from their surprise, and rise and wipe that man out. If the odds are less against him surprise will, however, aid him much.

Surprise is not absolutely confined to the battlefield. All nations strive to achieve military surprise during peace time. New weapons are eagerly sought after. It is even conceivable that some nation may hit upon a new gas or a violet ray, which will sweep all before it. The French discovered the mitrailleuse and the '75. The British

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discovered the machine-gun. Such peace-time inventions may not, however, come at the correct moment. In the piping times of peace they are sure to be copied by all who can find them out. Each nation watches the others jealously for such new arrivals. Woe betide the Military Attaché who allows the grass to grow beneath his feet. All new weapons must be tested to find out their potential value in war. Each new test must necessarily bring someone fresh into the golden secret until finally the secret is a secret no longer. If too jealously guarded a new invention may prove a snare and a delusion in war. The moral of the soldier may even be lowered if he finds a much belauded weapon to be a hopeless failure. Peace-time secrets of a military nature do not usually remain long the property of one nation.

In war the crop of inventions and antidotes follow one another in quick succession, for men's brains are directed exclusively to such work. The deciding factor of success is often a matter of production as it is the nature of these things that they must be employed in quantity. New shells, machine-guns, aeroplanes and tanks were all required in unexampled quantities to produce their maximum effect. the Germans failed to produce a proper antidote to the tank, because the antidote is another tank itself, and the production in the homeland could not compete with the demand. Half-successful antidotes, such as anti-tank guns and rifles, mines and obstacles were more within the Germans' compass at the stage in the war at which the British tank appeared in numbers.

The effect of such surprises on the battlefield is indeed transitory, and little will be gained if arrangements have not been made to take advantage of the moment. The German gas at Ypres, the British barrage at Neuve Chapelle or the tanks at Cambrai all failed to produce their maximum results through failure to take advantage of the surprise they created. Surprise is always easier to produce through a new weapon in the early stages of a war, when all are unaccustomed to its horrors. Human nature is such that man is very adaptable. The German Infantry were surprised by the British musketry fire at Mons, and the Russians by the German armoured cars at Gumbinnen and Tannenberg, yet the old British soldier marching up the road to Paschendaele could hardly have been surprised by any new weapon of war. The German Flammenwerfer employed against the young troops of the Kitchener Army with such success had little or none against the men of the old army of 1914.

The curious thing is that the human being quickly forgets its experience and has to begin all over again and be surprised once more, though not to the same degree perhaps. Even a short spell away from the din of war, on leave or duty, brought the officer or man back again to some degree unprepared to withstand surprise.

Experience gained is soon lost in peace. One of the most difficult problems which faces the soldier is how to preserve this experience. Much of it can be committed to paper, where it loses its local colour and may be neglected altogether if served up in this unviting guise. The best method of all is by personal example and

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actual practical teaching of the younger generations. Much in the same way trades used to be handed down from father to son and from master to apprentice, before the advent of books. War is something very real, much more a thing of life than an ordinary peace-time trade and the practical teaching by example is more a necessity in consequence. The leaders in a late war soon grow old and tired and many lack the energy to impart their knowledge in this way. To them there will never be another war and there is a certain laziness of mentality which prevents them from exerting themselves. Thus much priceless experience disappears. Before they go, it is the duty of these old experienced soldiers to impart their knowledge to the younger ones, and these must not fail to acquire the knowledge in the short time availible. Both must work together, or the next war will indeed be a surprise.

It is not perhaps by such material surprise that the greatest effects have been achieved in war. A study of history will suffice to show one this. It is more often in the realisation of how such weapons should be employed that the best results are obtained. Tactical methods or administrative methods are built up round new weapons. Napoleon surprised his enemies by introducing efficient methods of supply, thereby increasing his mobility and upsetting the calculations of his opponents. The motor car and the railway have both been employed in this way. Wellington developed his line tactics to give full effect to the close range effect of his hand-weapons. Waiting till they saw the whites of the enemy's eyes, his men destroyed the French columns, which had been so far invincible. Frederick developed precision of drill on the battlefield to such an extent that he bewildered his clumsy opponents. The late war brought many changes in tactics, all antidotes to some particular form of defence. The German deep dugout which gave such immunity from heavy gunfire, became nothing but a trap when the tactics of over-running them and mopping them up afterwards became the order of the day. The tank defeated the barbed wire and the machine-gun nest until the pill-box arrived, and with improving anti-tank defence, these monsters took to concealing themselves in smoke.

Tactical methods upon new lines often pass unnoticed in peace time and do not create such an impression as some new invention. Only the shrewdest of observers can judge if such methods are really new and effective. Methods which suit the psychology of one nation may not suit another. The long-service soldier belonging to an educated nation can be trained to operate in more isolated bodies than the more uneducated. The best results in war will therefore be obtained by a careful development of tactics in peace. The greatest of care should be taken to prevent peace manœuvres developing into "review-tactics," for the soldier will certainly do in war that which he has been trained to do in peace, and the punishment exacted upon the first clash may be too severe to bear.

How often did one see the German cavalry charging unbroken infantry for the benefit of their royal master and a vast assemblage of

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foreign observers? Carelessness in the setting of impossible schemes and in the checking of impossible movements are amongst the vices of a peace-trained staff. There are many thinking young officers who find that training in peace leaves off at the moment when their problem is becoming more interesting. How often did one not see or rather hear the "cease fire" blow at the moment when the troops had got to grips? The most important part of an attack was glossed over or not even considered, for the staff and command wanted its lunch. If an assault was actually allowed at all, it was usually in the form of a long run over bad ground which exhausted the men to such a degree that they would have been incapable of crossing cold steel with the man quietly waiting for their arrival up a steep slope. The question as to whether men should further exhaust themselves by cheering was also hotly debated. There are so many practical difficulties against which the junior officer runs. He must be taught to realise these difficulties, to put them to his senior and to ask for a solution. Such questions must be sympathetically met by the senior and it is the duty of the staff to see that each new difficulty is carefully considered and that an antidote is produced and properly tested by every practical means. Each stage of military operations must be dealt with in a methodical way or the one insuperable obstacle may lie unconsidered.

The power of barbed wire to stop an enemy from coming to grips and the increasing volume of fire of modern magazine rifles and machine-guns gave an enhanced power to the defence. To stop at short range under heavy fire meant annihilation.

Numbers were of little avail. Yet even the shrewdest observers in the Russo-Japanese war failed to realise that here was the deciding factor in the next war. The matter was indeed considered, but the solution did not exist in 1914. The thinking young officer who saw the effect of the rapid individual fire of his men against plates could not have failed to realise that some means must be found to destroy wire or the attack would fail. And yet, late on in 1915, men on both sides were being asked to go out and cut wire with wire-cutters. At night-time these efforts proved as futile as they did in day-time, owing to the production of artificial lights. The cutting of wire by shrapnel and high-explosive was said to be impossible, owing to lack of ammunition, and yet war proved that this was necessary. The engine of a motor vehicle had reached a state of high efficiency by the time of the Russo-Japanese war and experiments with tracked vehicles had proved that such a method of covering the ground was indeed possible, and yet it was far on into the great war before the tank was evolved in a practical state. Should not both these methods have been properly developed in peace-time?

There must be many problems which face the junior officer at the present moment, and it is essential that these should be discovered and examined. Evolution of tactics must come from the bottom, and it is the duty of staff and command to see that these problems are properly ventilated. We are on the threshold of great developments

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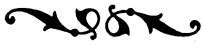
in the air. Movement on the ground is becoming increasingly difficult, and yet the struggle will eventually have to be settled on the ground. There is no use hiding our heads in the sand. The soldier in the next war will not be the tried veteran of the days of Paschendaele, he will be a mere child in comparison.

He must not be surprised by the increasing power of the air. He must be warned of his danger, and shown how to avoid or at least minimise casualties. Petrol, the life's blood of an army, must be properly stored, concentration camps must no longer consist of rows of beautifully aligned white tents. Troops adopt a special formation when under artillery fire, they must do so also against air fire. Enemy air-power can skip over the ground forces at will and no part of a theatre of war can be regarded as immune. March formations, assembly positions and a whole host of minor matters may require extensive modification. Many of these matters are already beyond the imagination of the junior officer and will become further obscure as the experience of the great war recedes. We must ensure that the junior officer is given a proper picture of war as it is likely to be and that he clearly states his difficulties as they arise.

Only thus can we hope to create surprise in our opponent, and ensure that we ourselves are not overcome in like manner.



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ARTILLERY CO-OPERATION WITH INFANTRY.

A scheme of combined training.

BY CAPTAIN A. W. G. WILDEY, M.C., R.G.A.

ONE of the factors militating more than any other against the successful combined training of the two arms, is the difficulty in simulating battle conditions as regards the actual visual appearance of artillery fire on hostile positions produced as the result of infantry calls for support. It usually happens at field-days, and on other occasions when one pretends for a while to be at war, that when artillery support is ordered for a certain attack, the only result as far as the infantry is concerned is two rounds of 'blank'; the dense smoke of which can be seen for miles. The position of the guns is given away, but beyond that the infantry have no certainty that their demands have been correctly interpreted, or that the target that they want engaged has been properly shot at. Messages to the guns describing targets are not always easy to write, and when received sometimes difficult to interpret. On the ordinary field-day or 'tactical exercise' such messages may be written, or orders for an operation may include certain artillery tasks. For the rest it is invariably assumed that the guns have been successful, that the position shelled offers no further resistance, and the infantry move forward to the next phase at a pace which would be impossible in actual battle, where movement must depend on the result of fire. The result is that neither arm really learns very much about the methods and difficulties of the other; inter-communication is not really tested, and that most important tactical principle, the combination of fire with movement, is never practised at all; since fire, or rather the visible result of it, is absent.

The scheme about to be described was evolved with a view to introducing a certain degree of reality into tactical exercises in the field. It has been tried in practice, and has been found to work very well. The amount of preliminary preparation required is not very great, and simple schemes can generally be arranged at no more than two days notice, provided a suitable area of ground can be found. As a demonstration of methods it will be found to be excellent.

It is claimed for the scheme that it provides a valuable exercise in the following points of training.

(i) Familiarizing artillery personnel with infantry methods, and vice versa.

(ii) Getting infantry officers accustomed to communicating their wants to artillery.

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(iii) Practising infantry and artillery signallers in combined work.

(iv) Practising infantry commanders in working with artillery commanders.

(v) Practising F.O.O's in selecting and engaging targets.

(vi) Practising infantry officers in locating and pointing out targets, and if necessary observing fire on them.

A certain amount of preliminary preparation is necessary. A suitable area of ground must be selected, preferably one that gives a considerable amount of low cover, such as scrub, boulders, or long grass. It should, if possible, have some form of continuous cover along one side of its length, such as a wood, concealed road, or ravine. Its size will depend on the size of the force carrying out the exercise, whether company or battalion.

We will suppose, for the sake of clarity, that it is intended to demonstrate the attack of an enemy position by a company acting as part of a battalion, with a section of guns in support. The ground must first be reconnoitred from the enemy's point of view, and his probable defensive positions, strong points, M.G. nests, and other points d'appui decided upon. A few of these would be selected as the most probable artillery targets. These targets must then be 'pegged'. A number of wooden pegs are required, and there are placed in the probable line of fire of the guns, at 25 or 50 yard intervals, the target being at the centre of the line of pegs. A few pegs may be placed laterally at 10 yards intervals. With a little ingenuity 'jumpers' and other forms of surprise targets may be also arranged.

Next, a 'range party' is required. It should consist of an officer, referred to as the 'range officer,' four telephonists with telephones, and about six fatigue men. This range party acts as follows:

It lays a telephone line the whole length of the ground, along one side of it, preferably under cover, hence the desirability of having continuous cover along that side. A length of loose wire about 200—300 yards long is wanted which can be used to connect the artillery O.P. from wherever it is selected to the nearest point in the range line. The party carries a number of smoke puffs. When a target is engaged, all the customary orders are sent down the range line to the range officer exactly as they would be to the guns. [Note that the presence of actual guns is not necessary; if they are present, the same orders are also passed to them by the battery signallers in the usual way; the position of the guns does not greatly matter, it makes no difference to the quality of training the battery personnel get]. When the initial range and line have been ordered, the range officer acts exactly as though a series were being fired on a miniature artillery range, ordering his men to fire smoke puffs to represent the burst of shells according to the ranges ordered, the error of the guns being simulated by the puff firer standing at a range peg and throwing the puff, after lighting the fuze, a short distance forward or back from the peg. The range officer can make the first rounds fall short or over the target, or right and left as he pleases. Fire on the target is continued until the infantry are satisfied, or the bombardment has

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lasted for the length of time ordered. Subsequent targets are engaged in the same way, whether deliberately ranged on, or fire for effect is ordered without previous ranging. The range officer must have a stop watch and be careful to make full allowance for time of flight; after reporting 'shot one', 'shot two', etc., otherwise the infantry are apt to get false notions of the time required to deal with targets.

This scheme was first carried out in a training area in the summer of 1918. A company of a cadet battalion made an attack, as part of an imaginary division, against a position organised in depth. Two objectives were given about 400 yards apart. In the attack on the first objective one platoon was 'held up' by a machine gun, and called for support. The F.O.O. was with the battalion commander on rising ground half-a-mile back, and at his request engaged the target; the information with description of the target coming back to battalion H.Q. through the company commander both by signal and runner. While the M.G. was being dealt with, another platoon worked round its flank in approved style and it was forced to capitulate. Reorganisation of platoons on the 1st objective was hampered by the galling fire of a second machine gun nest, which had to be knocked out. Finally the advance to the second objective was held up by a strong point in a quarry. This was given a short barrage which lifted at the moment of assault. The whole affair was quite realistic, even to the dropping of a short shell amongst the leading infantry, owing to a wrong order being given by the B.C. The shooting was carried out by a class of officers undergoing training, and the B.C. was changed between each series. The remainder of the class, and a number of infantry spectators watched proceedings from near by and heard all orders given. The communications between the two arms were kept busy the whole time, and the signal personnel derived great benefit by actually seeing the result of their work. The time taken was four hours, including the final discussion. There were no long checks or delays.

A scheme worked out on these lines is eventually a demonstration. Any of the various phases of attack or defence can be arranged.

The scheme was never practised with any larger forces than a company and a section, though I do not think there would be any difficulty in arranging an exercise for larger forces. More than one range party might be required, one for each battery engaged, and they might have to be stronger than the detail given above shows.

Provided there is plenty of small cover, the presence of the men who are firing puffs is no drawback. No difficulty was experienced in firing the puffs or in setting them off in the required places. The men soon learned what was required, and no doubt after a certain amount of experience has been gained it might be possible, without previous pegging, to engage any target, thus adding greatly to the scope and value of the exercise. All the more intricate methods of ranging, such as 'danger' shoots or ranging on the line O—T can be practised; the above example includes both. Provided suitable ground exists,

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and most of our training areas provide such facilities there is no reason, given an adequate supply of smoke puffs, why such schemes should not be undertaken two or three times a week during company and battalion training. The procedure may sound complicated, actually it is simple, and a small scheme can be arranged at a day's notice. There would be no difficulty in arranging a scheme embodying all the more important phases of attack and defence which would cover the whole period of battalion training. If a battery were attached to a battalion during that time and companies and sections changed from day to day, the resulting benefit to both arms in the way of co-operation and liaison would be very great, and both would gain greatly in the knowledge of each other's methods and difficulties.

It remains to be added that an O.C. 'survey' is wanted, with a small party, to provide suitable targets at the right time; and a 'director of operations' to see that the various phases follow one another in logical order, and eventually to sum up and explain the lessons learned in the day's work.

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AN IMPERIAL WIRELESS SERVICE.

BY CAPTAIN M. N. T. GUBBINS, O.B.E., M.C., R.G.A.

IT is intended in this article to summarize very briefly the development of Imperial Wireless about which there have recently been many articles in the Press, and to consider the advantages that will accrue to the Empire when its various parts are brought into direct communication with the Mother Country and with each other by this means.

Imperial communications have so large an influence on Imperial Organisation that they deserve very close attention, and it is thought that a summary such as this may be of help to officers who are studying the subject for examination purposes.

In 1919/20 an Imperial Wireless Committee was formed to consider the best means of linking up the many scattered parts of the Empire by wireless, the original recommendations for which had been made in 1911-1912.

The objects to be served by an Imperial scheme of wireless communication are twofold :—

1. Commercial.
2. Strategic and Political.

It might seem that by considering the commercial aspect before the strategical one is putting the cart before the horse, as commerce must be wholly dependent on the measure of security afforded by the joint action of the forces of the Empire. The reason for doing so will be readily seen in the report of the committee. It would be economically impossible to institute separate lines of communications for commercial and strategic purposes, nor would this be necessary. The policy is and always must be to establish a good commercial service throughout the Empire which will with very few exceptions serve every strategic need.

1. *Commercial.*

The three chief factors of a satisfactory commercial service are cheapness, reliability, and speed. Commercial requirements are much more exacting than strategic requirements, but where these two classes coincide geographically a good commercial service will, with two considerations excepted, more than fulfil every strategic need. The exceptions are; firstly, that the stations must be in defended or easily defensible areas, that they must be adjacent to areas of established military concentration, and they must not be situated on small islands or be liable to destructive bombardment from the sea; and secondly, that adequate arrangements have to be made to ensure secrecy.

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Germany, for example, realized before the war that she must have communication with her African colonies without messages passing through other hands. The only possible solution was by means of wireless. This led her to instal powerful wireless stations in Togoland, the Cameroons, South-West Africa, and at Dar-es-Salaam. These stations further enabled her to communicate with all her ships within a radius of 1,500 miles of each of these stations. They were the main overseas objectives of the Allies during the earlier part of the war.

The geographical distribution of the Empire indicated, in the opinion of the committee, the following essential main lines of communications :—

Eastward.

England—Egypt { India[1]—Singapore— { Hong Kong. / Australia[3]—New Zealand. / Baghdad / Nairobi—Windhuk[2]—Cape Town

Westward.

England—Canada.

South-Westward.

England—Bathhurst.

For reasons of economy it appears that a scheme of Imperial communication will best be effected by the employment of the method of transmission by steps of about 2,000 miles.

2. *Strategic and Political.*

These are considered together as they are closely bound up with the question of Imperial Defence. There is in the Dominions to-day a growing desire to have some voice in the foreign policy of the Empire. They very rightly consider that as they contribute so largely to the defence of the Empire that they should be consulted on all matters affecting foreign policy.

The navy requires quick communication with every naval base in the Empire and means of transmitting naval orders to every ship of and above the class of light cruiser wherever it may be at sea. These demands are met by the above scheme.

The chief military requirments are also met by this scheme.

In cases where one of the fighting services should require subsidiary communications to places where little or no commercial needs exist, the station at such locality should be erected and maintained at the cost of the service requiring it.

It will be seen that the proposal in 1920 was to establish wireless communication with the Dominions by means of the link or indirect system. This was diametrically opposed to the views of the Austra-

[1] Poona is considered by the military authorities to be a suitable site in India.

[2] Windhuk, the old German station 800 miles north of Cape Town, could be easily made by the Union Government into an up-to-date wireless station. It is connected by land lines to Cape Town.

3. There is in existence a service from Australia to New Zealand.

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lian government. Experiments had been carried out early in 1918 in Australia to establish direct communication with England, and at the time that the Imperial Wireless Committee was sitting it was already realized in Australia that direct communication was practicable.

The whole matter was consequently held up until the Imperial Conference in 1921, when Mr. Hughes stated that, since direct communication had been proved to be practicable, Australia could not be satisfied with communications involving links in other countries. It was therefore agreed that Australia should establish direct communication with the United Kingdom on lines to be decided by herself.

In March 1922, the Australian government approved of the agreement with the Amalgamated (Australasian) Wireless Company Ltd., whereby the company undertook :—

(a) To erect a high power station in Australia capable of direct communication with Great Britain and North America, and to arrange for the operation of suitable corresponding stations in England and Canada. The Australian station will be erected in the vicinity of Sydney or Melbourne.
(b) To erect feeder stations at the capital cities of the other states.
(c) To provide communication between Australia and the surrounding Pacific islands.
(d) To provide communication for ships at sea.
(e) To link up isolated inland settlements which cannot conveniently be connected to overland wire telegraph and telephone services.
(f) To provide direct communication, when those services are established, between Australia and all remaining countries of importance in Europe, Asia, Africa, and America, and as soon as the other Dominions, such as India and South Africa, have established suitable high power stations, to conduct inter-Dominion services.

The Amalgamated Wireless Company has recently invited tenders for the execution of this scheme. The technical conditions drawn up meet the requirements of a high-speed commercial service, operated on a remunerative basis, while offering substantial reductions over cable rates in the cost of all classes of messages. The Australian Parliament has a controlling interest in the Amalgamated Wireless Company. The scheme will be conducted on purely commercial lines, but it has been designed to meet strategic requirements, and in war the complete organization, consisting of wireless stations, personnel, factories, and administration, will become a strategic unit.

The service will probably be working in 1924.

It is interesting to consider very briefly why the relay or step system was discarded.

Australia was to have one station at Port Darwin or Perth, designed for communication with Singapore, and forming the end of a chain connecting her with the United Kingdom through Egypt and India. It was considered particularly unwise to leave Australia, the most distant outpost of the Empire except New Zealand, dependent for her communications with the heart of the Empire upon three relay

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stations which might not be available at a critical moment. It is true that the 1919-20 committee stated that their proposed stations would be able to communicate direct when atmospheric conditions were favourable, but Australia felt that she needed a wireless service that could communicate direct in unfavourable conditions, and particularly when hostile nations would undoubtedly attempt interference.

If at any time, the British naval forces should have to operate in the Pacific, a direct wireless service would be invaluable for communications.

It was also realised that a chain station would have a much lower earning capacity than a station communicating direct, because the total revenue would have to be divided among several stations instead of between only two.

Strategically the scheme was considered unsuitable for Australian requirements, because such an important station should be in the eastern states, where it could be more effectively defended and be near the Headquarters of the naval and military authorities.

The commercial system proposed by the committee of 1919, did not satisfy strategic requirements and this was the main cause that prompted the Australian government to veto it in favour of the direct system. Thus we see again that, though the policy is to establish first and foremost a good commercial service, it is fully realised that this service must conform to strategic needs.

The case of Australia has been dealt with at some length as she has been the first among the Dominions to give effect to the resolution adopted at the Imperial Conference of 1921. It has not yet been decided whether New Zealand traffic has grown to sufficient proportions to support the larger station.

India, though unable at present to afford the expenditure for the erection of a station, is considering a project to hand over the construction of a wireless station to private enterprise, arrangements being made whereby the government can purchase it after a period of years. She also was opposed to the relay system, whereby the wireless traffic to and from the east would be controlled by the link in Egypt, as she considered it undesirable that wireless communications should be transmitted through a sort of "bottle-neck," while India herself is the natural centre of eastern wireless traffic.

There is no time to be lost, however, if the French—who are making enormous strides in the development of wireless—are to be forestalled in the capture of eastern wireless traffic by building a station in French Indo-China, while another competitive danger lies in the Dutch Indies.

Canada has licensed the Marconi Company to erect a station at Montreal, and South Africa has given a concession to the same company but the station has not yet been built.

The Imperial government has now decided to issue licenses in England for the erection of wireless stations for direct commuication with the Dominions, Colonies, and foreign countries, subject to the conditions necessary to secure British control. A wireless station in the United Kingdom, capable of communicating with the Dominions,

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and operated by the state, is considered essential in the interests of national security, and such a station will be erected in addition as soon as possible.

The Marconi Company has stated that, provided they are not held up with regard to the granting of licenses, they are prepared to erect within 12 months a group of five high-power stations which will conduct telegraph services with the whole of the Empire, and with other distant foreign countries such as South America, China, and Japan. They are also prepared to erect an additional group of lower power stations to conduct services with all the capitals of Europe similar to what they are doing now between London and Paris.

A principle has at last been decided upon. Scientific developments have made a chain unnecessary and so settled the thorny question of state ownership versus private enterprise.

The value of this Imperial Wireless Service is obvious but may be summed up under two headings :—

Commercial.
Strategic and political.

Commercial.

It will be an enormous saving to the commercial community. A big reduction in telegraphic rates will give a big stimulus to trade, and by promoting trade within the Empire be of great assistance in settling the parallel problems of unemployment and emigration.

Strategic and political.

The distance of the Dominions from the Mother Country is a far more important question from the point of view of defence than from that of commerce. None of the Dominions could repel an invader single handed. The best they could do would be to hold out until effective assistance arrived. Cables might be rendered useless in such circumstances as they could be raised and cut thousands of miles out to sea, though this would be a most difficult operation.

The Dominions are no longer isolated colonies concerned only with their own affairs and unaffected by important events in other countries. They now occupy an important position in international affairs, and have become factors in the diplomacy of nations.

This change makes it imperative that the Dominions should be kept more and more fully informed upon international affairs.

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THE NEW MEDITERRANEAN PROBLEM.

By CAPTAIN K. V. B. BENFIELD, D.S.O., M.C., R.G.A.

General.

When in November, 1918, the German High Sea Fleet, steamed out of the shelter of its base at Kiel to surrender to the Grand Fleet, the reasons for Lord Fisher's policy of concentrating British sea power in home waters disappeared. For a brief time the Pacific Ocean then came to the forefront among the post-war problems of reconstruction in the organism representing the British Commonwealth of Nations, and for a short time it seemed as if the pendulum had swung from West to East and that the race for supremacy on the seas would begin all over again, but this time on the vast expanse of the Pacific. At the last moment the Washington Conference was held and this disaster was averted. But whilst British statesmen were engaged in dealing with Far Eastern problems at Washington, new influences made their appearance in the Mediterranean and England was forced to modify the policy she had been pursuing in this sea for the last twenty years.

The factors causing this change are sufficiently complex to warrant very careful and anxious consideration, not only from a naval point of view, but from a land and air view as well.

British interests in the Mediterranean are represented by Gibraltar, Malta, Cyprus, Palestine and Egypt. Compared with the remainder of the lands surrounding this sea our possessions are small; but considered from a strategic point of view their importance is overwhelming. They give us control of the Mediterranean: Gibraltar its north-western gateway; Malta, the sentinel between Africa and Italy; Egypt and Palestine controlling the approaches from the East.

In considering these possessions it is necessary to be on one's guard against one common fallacy. It is not they in themselves that give us supremacy in the Mediterranean, but the support which our fleet derives from them that is the deciding factor. Germany, in her desire for world supremacy established naval bases and military positions all over the world and discovered too late that cut off from free communication with them they were an easy prey to the fleet that ruled the waters surrounding them.

Political.

To realize the true importance of the Mediterranean we must study its political aspect from a foreign as well as imperial standpoint. Taking the chief foreign influences we can divide them up into French, Italian and Near Eastern spheres.

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As regards France, her aspirations appear to be turned away from this sea; figuratively speaking she seems to have turned her back on these waters. Her eyes are looking to the North-East, in the direction of the Rhine. For the present the Mediterranean is to her merely an adjunct to the work she is attempting on her Eastern Frontier. In her work against the day when she may have to face Germany again what is her greatest need?

Man-power is the answer. Her own population is fast dwindling, that of Germany is rising rapidly. In her extremity she has decided to tap the vast reserves of good fighting material to be found in her African colonies. Before the war she had already embarked on this policy to a small extent and it proved entirely satisfactory. In the event of a new clash of arms she is determined to make full use of this expedient. Already she is using black troops for garrison duties in Europe; this year 60,000 are being stationed in France.

From this it becomes apparent at once that the control of the Mediterranean, across which these reserves must be brought, is of vital importance to the French. But not only troops will be required to cross from Africa to France. A vast African Empire is contemplated; its products will supply France with all her needs; she would become independent of all other European nations, this is the dream of her present day leaders. The safe transit of her African wealth is therefore a matter of great concern to her. Geographical conditions help her here. The Mediterranean is, comparatively speaking, a restricted area. There is not much room in which to manœuvre, great fleets are therefore at a disadvantage. Definite routes must also be kept for traffic. The most efficient weapons against a fleet so handicapped are light and swift surface craft, submarines and aircraft. France is building all these. Her refusal to agree to any restrictions that might curtail the efficiency of the submarine as a weapon was very marked during the Washington Conference. Her efforts at achieving complete mastery in the air were the subject of anxious discussions in the House of Commons in March/April, 1923.

When we turn to examine Italian interests and aspirations in the Mediterranean we find them even more complex than those of France. From a comparatively secondary position in the so-called "Concert of Europe" as it existed before the world war, Italy has risen to one of the leading nations on the Continent if not in the world. With this rise to power has come a desire for greater, and perhaps complete, control of the Mediterranean. The "Times" in several articles a few years ago drew attention to Italian aspirations in this direction. A vast Empire extending from the Mediterranean into the heart of Africa had caught the imagination of Italian public opinion. Italian statesmen, in the treaty which preceded that country's entry into the war, the Treaty of London of April 26th, 1915, had obtained promises of extensions of her colonial possessions in Africa as equitable compensation for any French or British colonial gains at the expense of Germany. These promises were faithfully kept by Great Britain and

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France, and though claims, which, to say the least of it, were somewhat extravagant were put forward by various parties, notably the colonial congress at Naples, her statesmen were able at that time to damp down Italian ardour, and a modest programme of colonial expansion was inaugurated. France agreed to a common colonial railway policy in Tripoli and Tunisia, and valuable commercial agreements were also entered into by these two powers.

With the advent of Signor Mussolini a change has taken place, an intense feeling of nationalism has arisen and the Mediterranean is now looked on as an Italian lake. The British stronghold of Malta has come in for much propaganda and even D'Annunzio has made Malta the subject of one of his literary effusions. A small and noisy pro-Italian party whose object is the transfer of Malta to Italy exists in that island.

From this it will be seen that Italian interests in the Mediterranean have assumed an entirely new aspect. This is further realized when one considers that one of Italy's chief pre-occupations before the war, a powerful Germany and Austria with both of whom she had to keep the peace, has now disappeared, leaving her free to concentrate her activities elsewhere. The outcome of this policy has been the formation of a powerful separate air force for the whole of Italy and her colonies and the building of a large number of submarines and light surface craft. It will be noted that this is an exactly similar policy to that embarked on by France.

The Near Eastern factors are even more complex. The key to the whole situation is to be found at Constantinople—the connecting link between East and West. The downfall of Germany and Russia, The rise and decline of Greek influence, the awakening of fresh Turkish aspirations under the able leadership of Kemal has left not only the Near East but the whole of the Moslem world in a state of turmoil. British interests, political, strategical and economic, are of vital importance in this quarter of the world. The late Admiral Mahan clearly expressed the position when he stated that a highly developed Moslem State firmly established in Turkey in Asia, with an efficiently organized Army and Navy, coasting the Black Sea, the Persian Gulf, the Red Sea and the Levant would control the issues from vast territories to the outer world. The issues in question, Russia in the north and India in the east, mean the very life blood to the British Empire. Trade with Russia, the granary of the world, though at a standstill at the present time, is an absolute essential to the prosperity of Great Britain. The need for safe communication with India is a platitude and requires no elaboration. How British interests in the Levant can best be safeguarded is a problem for which a satisfactory solution has not yet been found. Some advocate a strong independent Turkey, others point to the past and show that friendship with Turkey has always brought disaster in its wake. We will leave this question to the politician to work out. One great fact has emerged from our Near Eastern experiences: that peace can only be maintained by the firm

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attitude of Great Britain; by the long arm of her Navy backed, if need be, by her land and air forces. It is said that a Greek Army is ready to march on Constantinople from the Maritza, that Bolshevik Russia is casting longing eyes on this city of eternal strife.

Our Mandate over Iraq and Palestine gives us control of the approaches to the Lower Euphrates and over the approaches to Egypt; at the present moment these advantages might appear negligible, but a time may come when they will be important factors in supporting the structure which represents the Empire. That both these countries do much to consolidate our position in the Mediterranean cannot be gain-said. Further complications in the Levant are caused by the presence there of other European powers, notably France, whose policy has not always been in accord with ours. America is also making a bid for commercial supremacy which in the long run means political supremacy as well.

Strategical.

Having touched on some of the foreign influences at work in the Mediterranean and its neighbouring lands we can consider the strategic problems confronting us in this sea. It is proposed to deal with these separately from a Naval, Land and Air point of view.

Naval.

Taking Naval consideration we find first that the Mediterranean is the highway leading to the East. A straight line drawn from Perth in Australia to Halifax in Nova Scotia runs through the Red Sea, Suez Canal, across the Mediterranean and via the Straits of Gibraltar. It is therefore the shortest route. The Panama Canal, the railroads crossing Canada from the Atlantic to the Pacific and also the Cape route, although not vastly longer than the Mediterranean route, have not been able to challenge the latter's predominance as the main artery leading to the East of the British Commonwealth. It is not overstating this case when we say that with the loss of Mediterranean supremacy the Empire would lose the supreme position it now holds among the nations of the world.

We possess, in Malta and Gibraltar, two first class Naval bases. They are both situated in strategically commanding positions. In addition, they are important commercial ports ensuring a constant turnover of large stocks of coal and oil fuel and other Naval supplies; the advantages of this factor are obvious. A fleet based on Gibraltar can sweep the Atlantic or the Mediterranean. From Malta a fleet can operate on interior lines against any of the European nations bordering this sea and can reach the key to the East—Constantinople—in not much over 48 hours. The importance of the latter point has been demonstrated time and again during the last three years. From Malta the British fleet was enabled to control the Near East situation without any difficulty. It was from here depleted stocks were made up and it was here ships returned to refit.

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As regards the strength of the fleet to be maintained, this depends on the changing world situation and at the present time is governed to a great extent by the conditions laid down in the Limitation of Armament Agreement entered into at the Washington Conference.

One other consideration, which from a Naval aspect must not be lost sight of, is the fact that the Mediterranean is situated in the very centre of the British Empire and fleets can move from here to any threatened part in a very short time.

Land Forces.

The distribution of British land forces in the Mediterranean is based on two main considerations. Firstly, internal or local defence such as in Egypt, and secondly, strategic positions such as Malta. We are unable to keep a large number of troops in the Mediterranean because there are very restricted facilities for training and accommodation. Gibraltar and Malta are places of very limited area where training even by Brigades is practically impossible. As regards Egypt, a sovereign state has been set up and we are only able to keep troops there for certain definite roles, such as the defence of the Canal; a concentration on a large scale, except in case of actual war, is now not possible.

Happily there is no necessity for a large force in the Mediterranean. The normal commitments of the Empire in the Near East are usually met by the employment of a brigade or two of Infantry and an appropriate proportion of other arms. No attempt is made to keep troops for use other than in "small wars," and all our establishments and training are based on this condition.

The importance of these small garrisons, consisting as they do of highly trained professional soldiers must not be underestimated. The Germans found this to their cost. An even more recent example is to hand in the use made of troops stationed at Gibraltar, Malta and Egypt during the Near Eastern crisis in September, 1922, which resulted in the occupation of Chanak and the Gallipoli Peninsula. The first troops to arrive there were Infantry Battalions and Artillery from Malta, followed very shortly by troops from Gibraltar and Egypt. No one will ever know how far their timely arrival turned the scales in favour of peace, but when one realizes that to the Turks they were the practical manifestation of the will of the British Empire one realizes also that the fact of their being only a handful of men was of small importance. The value of the Mediterranean stations did not cease with the departure of their garrisons. To quote only one example, at Malta preparations were at once made for turning the Island into a large base where stores could be collected and sick and wounded could be dealt with. The importance of Malta as a convenient base was fully understood during the Gallipoli campaign when it became a haven of refuge to many thousands of sick and wounded.

A further consideration from a strategic point of view is that the Mediterranean, as already stated above, is centrally situated and troops

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could be moved east and west, north or south with great swiftness to any threatened part of the Empire.

To sum up the military situation in the Mediterranean we can say that conditions here are specially favourable for meeting all Imperial requirements and also for exerting if need be any necessary pressure on any European or Asiatic power that may run counter to our interests in the Mediterranean, and in the Near East.

Air Forces.

The broad strategic considerations enumerated above are equally applicable to air strategy in the Mediterranean. Here the conditions for the full development of this arm are exceptionally promising. For the greater part of the year flying can be carried out in ideal weather. Distances are such as to make commercial development easy and paying, and since it is an accepted axiom that sound commercial aviation is the only true foundation on which to build a fighting air force we must expect great developments among the nations living on the shores of this sea.

France is far ahead of us commercially and from a service point of view she overshadows us numerically. She means to link up her African possessions to the home country by regular air services and a big scheme is now being put into practice. The pioneers in this work are her military aviators.

Italy, under the able guidance of her Fascist Premier, is following suit, and a large sum has been voted this year to put Italian aviation on its feet again; since the armistice it had gone back considerably. The formation of a separate air force has already been noted.

British service aviation in the Mediterranean has reached a high standard of efficiency. In Egypt the Royal Air Force has established a large air centre, where reserves can be based, whence a regular service is now run to Baghdad and whence the Canal can be controlled and protected. This centre also forms the base for aircraft working with the Navy in the Eastern Mediterranean. Though the main British air power will normally be concentrated in Great Britain, the heart of the Empire, yet a good case can be made out for the maintenance in Egypt of strong air forces. It is interesting to note the distances to various important British centres from Egypt :—

From Egypt	to London	3,500 miles.
,, ,,	to Bombay	3,000 ,,
,, ,,	to Cape Town	5,000 ,,
,, ,,	to Malta	1,200 ,,
,, ,,	to Aden	1,600 ,,
,, ,,	to Khartoum	1,000 ,,
,, ,,	to Halifax	5,000 ,,

The link between Great Britain and Egypt is the Mediterranean, with Malta as a half-way house. At this latter place the Royal Air Force has established a first class air station, and commercial flying is to benefit by work done by the service squadrons as far as aerodromes and landing grounds are concerned.

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But all these satisfactory signs of British air progress cannot allay the feeling of insecurity and apprehension which the advent of the air arm must cause to all students of Imperial Defence in regard to our position in the Mediterranean. France and Italy together can literally surround this sea with air bases. From the mainland of France and Italy, from Sardinia and Corsica, from their African possessions, Algeria, Tunis and Tripoli, from mandated territory in Asia, i.e. Syria, the waters could be swept by aircraft, our naval forces could be harassed and bombed at sea and their harbours filled with gas. All supplies could be sunk long before they reached their destination. Last, but not least, our dockyards could be destroyed with comparative ease. There is only one way of dealing with this new problem. By the building up of an air force in the Mediterranean equal in strength to any air squadrons that could be launched against us and by the develcpment and perfection of anti-aircraft gunnery, both technically and tactically.

Conclusion.

The new problem of the Mediterranean is a far more complex one than in the days when we abandoned this part of the world to prepare for the conflict from which we emerged victorious, mainly because our strategic dispositions had been based on sound principles. They enabled us to preserve the freedom of our communications. This is the vital necessity of our scattered Empire, and it is for this reason we are hurrying back there now. The new influences at work will require all the strength of the British Commonwealth of nations to meet them successfully. Intense nationalism, a desire for expansion, a belief in the efficacy of Might, these are some of the new currents set up during our absence. In the air has appeared a weapon which, used unscrupulously, can sweep away navies in a night, and can in a few hours carry death and destruction to peaceful and unsuspecting citizens many hundreds of miles away.

A short time ago it was said that England would take no part in any great European war for at least 10 years, but recent events have not gone very far in support of this statement. Relations between allies have hardly been as satisfactory as might be expected, and already the chief powers are drifting into well defined camps. England's policy is one of peace, yet we must remember that the desire for peace does not mean there will not be war. Far more on our preparedness and on the success of our Mediterranean policy depends the fulfilment of this desire.

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THE AERONAUTICAL EXHIBITION.

Translation of part of article by Lieut.-Col. E. Pagezy in "Revue Militaire Française" for May, 1923.

BY MAJOR T. C. NEWTON, D.S.O., O.B.E., R.F.A.

QUESTIONS OF THE DAY.

An Air Ministry :—

The press and the aeronautical congresses have been almost unanimous in demanding the union of Naval, Military and Civil aviation under one Air Ministry.

In view of this unanimity or quasi-unanimity the opposite opinion is evidently a very unpopular one. But thinking, rightly or wrongly, that it is the right one for the general good we shall try to defend it.

Among the arguments given in favour of an Air Ministry those which strike the man in the street are as usual the arguments of sentiment. Of these there are two principal ones.

First argument.—England has created an Air Ministry.

Yes, England has created an Air Ministry in spite of the objections of the deeply regretted Field-Marshal Sir Henry Wilson. But England is an island. Her geographical situation leads her to envisage the frequent employment of a large independent air force.

But official England is like the rest of us. She makes mistakes sometimes and the Air Ministry does not please all the English. The Navy complains bitterly about it. The Navy wants back its aircraft and is too powerful not to achieve its object some day.

Second argument.—Based on the so-called similarity of the things of the air and the things of the sea.

We have a Ministry of Marine. We must have a Ministry of the air.

But there is no similarity.

As regards materiel we have already shown that the formula "always build bigger" which has been that of the sea is not suitable for aircraft.

As regards employment and organisation there is a deep gulf fixed between the Navy and the Air Force.

The Navy has its own special theatre of operations. Therefore it is natural to make it entirely independent. The Air Force has not got its own special theatre of operations. It may have to carry out certain long-range bombing with a degree of independence. But as a general rule it acts either in aid of the land army and with the assistance of the land army, or in aid of the navy and with the assistance of the navy.

The Air Force is an arm which must have its own special organisation and its own special status, but it is an arm among the other arms.

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Take the aircraft which played the biggest part in the war, the aircraft of reconnaissance and observation. They are the eyes of the high command and the eyes of the artillery.

They are the eyes of the high command: our Division, Corps and Army Commanders and our Commander-in-Chief can do nothing unless they have under their orders a force of reconnaissance and observation aircraft which understands the tactics of the other arms from A to Z and is capable of seeing clearly in the confusion of the battlefield.

They are the eyes of the Artillery: our artillery is impotent unless its fire is directed and regulated by a force of aircraft working in close liaison with it and understanding all its methods.

Take the fighting aircraft. Their principal task is to protect our observation aircraft and to harass those of the enemy. They can only carry this out if they are placed under the orders of the commander of the aircraft of the Army and of the Army Commander.

Take the bombing aircraft. There are two methods of bombardment; bombardment by the gun and bombardment by the aeroplane. They are complementary to each other and are so intimately connected that some of the Germans have even gone so far as to suggest that the bombing aircraft should be placed under the orders of the Army Artillery Commanders.

Take the low-flying aircraft. Rightly or wrongly many officers envisage it as an arm of the assault, launched against the enemy in successive waves and playing its part in the battle as an instrument plays its part in an orchestra. It is inconceivable that it should not be under the orders of the conductor of the orchestra.

In the war of former days the Army Commander fought his battle with his infantry, his cavalry and his artillery. In the war of to-day the Army Commander fights his battle chiefly with his infantry (infantry and tanks), his artillery and his aircraft. Therefore, the army commander must command his aircraft. It is not enough for the aircraft to work in liaison with him; they must be under his orders. Being under his orders in time of war they must be under his orders in times of peace.

As regards the independent aircraft, the Independent Air Force which carries out long-range bombing must also be under the orders of the Commander-in-Chief who is responsible for the issue of the war and who alone is in a position to set the tasks and choose the objectives.

People sometimes say "the navy employs aircraft and the army employs aircraft, unite them under a single ministry."

One might as well say "the navy employs guns and the army employs guns, unite them under a single ministry and make a Ministry of Artillery."

We have suffered too much from the watertight separation of arms to allow it to begin again in the case of aircraft. At the present date an army without aircraft is no longer an army, a navy without aircraft is no longer a navy, and one can no more take away the aircraft from the army and the navy than one can take away their guns and their rifles.

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"ORGANISATION OF GERMAN ARTILLERY."

EXTRACTED BY

MAJOR-GENL. HON SIR F. R. BINGHAM, K.C.M.G., C.B.,

from "The Organisation of the German Army in the World War."

BY HERMANN CRON.*

1. At the commencement of the war, the Artillery consisted of two sharply defined branches—Field and Heavy Artillery.

2. The Field Artillery was attached in Regiments to the Infantry Divisions whereas the Heavy Artillery consisted of only one Battalion (4 batteries) per Army Corps and regarded as a purely secondary factor.

Later, the importance of Heavy Artillery became apparent more especially as the German Field Artillery was not equal to the French either in guns or gunnery. It was apparent that a closer co-operation between the superior German Heavy Artillery and the Field Artillery was a necessity.

3. In Autumn 1916 the leaders of the Great General Staff—Hindenburg and Ludendorf—decided to organise and amalgamate the two branches and to group them under a Higher Artillery Command.

4. In February 1917, it was laid down (a) that Generals of the Field Artillery as well as the Heavy Artillery were to be abolished and (b) that in their place new posts should be created to be occupied by either Field or Heavy Artillery Officers, these to be as follows :—(1) Generals of Artillery Nos. 1 to 13 to be under the command of Army Commanders of each Army in the Field; (2) Artillery Commanders, to command the whole of the Field and Heavy Artillery formations attached to a Division. The Staff of these latter was to consist of at least one officer of Field Artillery and one of Heavy Artillery.

5. The existing General Commanding the Heavy Artillery at Great General Headquarters was not to be affected by this change but was to keep his position under the new title of General of Artillery No. 1. Working under him were the Inspectors of Artillery Ranging and a Staff Officer for Heavy Long Distance Fire.

6. In March 1917, the General received the title and the duties of Inspector General of Artillery Schools in the Field and at Home and remained attached to Great General Headquarters. His new duties ensured him a decisive influence on the gunnery training both of the Field and Heavy Artillery.

7. Sixteen Artillery Generals were appointed who all practically belonged to the Heavy Artillery. They were under the command of

* Die Organisation des deutschen Heeres im Weltkriege. Dargestellt aus Grund Kriegsakten von Hermann Cron, Oberarchivrat im Reichsarchiv.

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the Army Commanders of each Army who used them where they thought necessary for watching and carrying out operations with powerful Artillery Groups. In addition to these Generals who were allowed for Army Groups, there was an Artillery Staff Officer in an Army and also a second staff officer attached to him whose duty it was to take over the responsibility for the Artillery Reserves. The Artillery Commanders with the Divisions were the chief responsible authorities for the conduct of the artillery fire. They had under their command not only the normal Divisional Field and Heavy Artillery which was attached in 1917 but also, in case of expected hostile attack or advance by their own group, the special regiments of Field and Heavy Artillery concentrated for these occasions.

8. When the new organisations took place, 27 former (Heavy Artillery) Generals and 87 Field Artillery Brigade Commanders who came partly from new formations, partly from the Field Artillery and partly from the Heavy Artillery, became Artillery Commanders. On the 1st September 1918, the total number of Artillery Commanders, exclusive of five Divisions which had been dissolved, amounted to 220.

9. In the principle laid down for the conduct of a defensive battle in trench warfare from the 1st September 1917, stress was laid on the following points :—The placing of artillery put into the line for special battle purposes under the command of the Army or Corps concerned can only come into question in so far as the heaviest long-distance batteries are concerned, as it is necessary for the proper use of these guns to have a central control connected with the local signal service. This principle remains applicable in the case of an attack in trench warfare.

GERMAN FIELD ARTILLERY.

1. The types of Artillery employed with the Field Artillery were as follows :

7·7 cm. Field Guns.
7·5 cm. Mountain Guns.
3·7 cm. Guns (Infantry protection batteries).
7·6 cm. Guns (Infantry protection batteries).
10·5 cm. Field Howitzers.
10·5 cm. Mountain Howitzers.

2. The Infantry Divisions mobilised in 1914 had, as Divisional Artillery, 1 Brigade of 2 Regiments each with 2 Groups or 12 Batteries of 6 Guns—72 guns. Of these, 54 were 7·7 cm. and 18 were 10·5 cm. Howitzers.

The old Reserve Divisions had only one Regiment consisting of 2 Groups or 36 Guns.

3. In March 1915, it was decided that it was necessary to adopt the French method of 4 guns per battery and the formation of the new Field Artillery Regiments was commenced with this number of guns per battery. 6 Army Corps had each to give up 4 complete batteries of 4 guns; 2 Army Corps had to give up 5 batteries; and 1 Army Corps had to surrender 2 batteries. These 36 batteries were formed into new Field Artillery Regiments. The remaining 2 guns of

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these 36 batteries were formed into 4-gun batteries. This system was continued for the raising of new regiments.

4. The reconstruction of 4-gun batteries was completed about the middle of the year 1916—although, on the Western Front at the beginning of the Spring offensive of 1918, batteries were again composed of 5 and 6 guns, but without the necessary draught animals, it was really only a case of necessity and they could only be counted as 4-gun batteries. Neither men nor particularly horses were available in sufficient quantities to complete the new establishments. The extra guns were kept in reserve so that they could be taken into the line in case of an advance by the personnel and horses belonging to the other 4 guns. The establishment of Field batteries at the end of the war may be taken as 4-gun batteries.

5. In the Spring of 1915, the new Divisions raised were provided with 4 Groups but it was soon found that these could not be kept up and the organisation then became 3 Groups of Field Batteries per Division.

There were now 3 different forms of Divisional Artillery organisations, viz., those with 4 Groups, those with 3, and some with 2, and the completion of the weaker Divisional artilleries by new formations to a strength of 3 Groups took place very slowly.

The eventual organisation that was aimed at, but not reached until the Spring of 1916, was that each Divisional Artillery should consist of a Field Artillery Regiment of 3 Groups, two of 7·7 cm. and one of 10·5 cm. Howitzers.

As soon as the war developed into trench warfare, it was decided that in the Field Artillery Regiments the proportion of howitzers to guns should be as one to two.

6. In Autumn 1916, the High Command applied their energies to force through the equalisation of Divisional Artilleries and at the same time started to form a strong Army Artillery Reserve by taking from certain Divisional Artilleries one Regiment of two Groups which went to the Army Reserve.

7. On the 7th October 1916, all Divisional Artilleries which possessed only two Groups were ordered to form a third Group before March 1917 and arrangements were completed by this date.

In the Autumn of 1917, the Artillery Regiments of the Army Reserve which at that time only consisted of two Groups, were increased to three.

From this date forward the Field Artillery, apart from a few independent groups and batteries, was composed of Field Artillery Regiments and Regiments of the Field Artillery Reserve. These latter were placed at the disposal of an Army Group or Army for further allotment to Groups and Infantry Divisions as and when required.

8. At the commencement of the war the Field Artilleryman was only armed with a revolver, but in 1917, to enable batteries to defend themselves against air attack, each battery was supplied with two machine guns, so from this time onwards each battery was composed of two Sections of 2 guns and 1 Machine Gun Troop. This only applied to the Western front and not to the Russian or Balkan fronts.

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9. During the year 1917 the deficiency of horses which was apparent during the whole of the war, increased in intensity and in the year 1918, the Field Artillery were forced to substitute mechanical power for animal power in six Regiments of Artillery which were accordingly equipped with mechanical transport.

10. In peace time, Mountain Artillery had been continually asked for with the result that there were 22 Mountain Batteries in existence in 1914. By 1916, six Mountain Artillery Groups were in the Field and were provided not only with guns but also with howitzers namely—7·5 cm. Mountain Guns and 10·5 cm. Mountain Howitzers.

11. It was soon realised that for close-fighting purposes and for forward gun purposes in the Infantry front line, a new and particular form of artillery formation would be required and in May 1916, an Infantry Protection Battery with eight 3·7 cm. guns was formed and a month later, eight such batteries with 7·6 cm. guns were completed. At the commencement of 1917 a change was made to 4-gun batteries of 7·7 cm. guns and in addition in the West, 50 close-fighting batteries for defence against tanks without mounted equipment or horses, were formed out of available Field Artillery material.

12. It was soon realised that at close quarters, machine guns with armour piercing bullets could deal with tanks, and at greater distances, the ordinary Field and Heavy Artillery were able to deal successfully with a Tank attack. For this reason it was decided in May 1917 to get rid of the close-quarter batteries but to maintain the Infantry Protection Batteries for special purposes and the number of these was increased to 51.

The conclusion was come to that it was absolutely necessary for guns to go forward with the Infantry which, shooting direct at close quarters over open sights, could break down machine gun nests, strong points, etc. The only batteries available for this purpose were the few Infantry Protection Batteries above mentioned.

13. In 1917 as well as in the Offensive of 1918, Field Artillery Batteries were picked out from Divisional Artilleries as required and were put at the disposal of the Infantry Regimental Commanders as Infantry accompanying batteries.

14. At the commencement of the war, 941 batteries (6-gun batteries) took the Field. Later, 138 independent Field Artillery batteries were formed to man captured weapons but these independent batteries were slowly absorbed into Regiments.

15. Of the 11 Groups of Horse Artillery present at the start of the war, all were changed into Field Artillery except three.

16. At the completion of the organisation, the Field Artillery was composed of 297 Regiments, practically all of three Groups, which, together with a few independent Groups, gave a total of 2,712 Batteries (probably all 4-gun batteries). In addition to this there were 16 separate Groups, some in Palestine, some at Training Schools, etc. There were seven Mountain Artillery Groups (21 batteries) and 51 Infantry Protection Batteries.

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We may therefore say that the approximate number of field guns in possession of the German Army in all theatres of war and training camps was, at the end of the War—14,024 (of which 9,348 were Field Guns, and 4,676 Field Howitzers).

HEAVY ARTILLERY.

The most important calibres used were as follows :—

10, 12, 13 and 15 cm. Guns.
15 cm. Field Howitzers.
17 and 21 cm. Quick-firing Guns.
21 cm. Mortars.
24 and 28 cm. Guns.
28 cm. Coastal Howitzers.
30·5 cm. Coastal Howitzers.
30·5 cm. short Naval Gun.
35·5 and 38 cm. Quick-firing Guns.
42 cm. short Naval Guns.

1. These were, however, only the main types. Counting field guns, the total number of different types used in the German Army amounted to 168. These were, however, never all available at the same time, but were spread over a total period of the four years war, and included not only the originals, but the improved new models. 57 different types originated from captured material.

2. At the commencement of the War, Heavy Artillery in the form of Heavy Artillery Battalions and Siege Artillery Batteries belonged to Army Corps. In addition a few Siege Battalions of Heavy Artillery of various types were under the orders of the G.H.Q., and were placed at the disposal of the various Army Commanders as required.

The allotment to the Army at the commencement of the War is shown in the attached table. This shows that 148 batteries (including 36 Siege Companies) were mobilized for the Field Armies at the outbreak of War.

3. Of these 148 batteries 112 were Heavy Howitzer Batteries 15 cm. and 36 were Mortar Batteries.

4. The remainder of the German Heavy Artillery batteries were then in the fortresses, reserve, Landwehr, etc., and were evidently not sent straight into the field but new formations were made from them and provided with guns taken out of the fortresses or provided from new manufacture.

5. In 1915, trench warfare necessitated the distribution of Heavy Artillery with practically independent batteries and this was continued for a considerable period.

6. The increase of the Heavy Artillery steadily advanced and new units were formed, as stated above, from Fortress Guns and from batteries of the army at home and was followed by battalions of captures guns, especially those taken in 1915 from the Russian Forts.

7. In 1916 the Heavy Artillery was allotted in Battalion form to Army Corps but it was not till 1917 that the system was adopted of placing one Battalion of Heavy Artillery continually at the disposal of Divisions.

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8. As a general rule, but by no means an invariable one, Battalions consisted of three batteries, two of Heavy Howitzers and one of Heavy Guns. The remainder of the Heavy Artillery was kept as Heavy Army Artillery, as in the case of Field Artillery Reserve.

9. Thus we arrive at the final apparently symmetrical organisation, although it was not carried out in its entirety.

DIVISIONAL ARTILLERY.

Under the Artillery Command	(a) Field Artillery	3 Groups (2 of guns 1 of howitzers).
	(b) Heavy Artillery	3 Batteries (2 of howitzers 1 of guns).

The remainder of the Field Artillery and Heavy Artillery being treated as Army Reserve.

10. The number of Heavy Batteries at the end of the War with the Field Armies was 1,575 but it is not possible to translate this into guns as the book does not give any indication as to the totals. Also the types which needed large transport parks like the long 6-in. guns and coastal batteries were composed of 2 pieces only.

11. In connection with the 21 cm. Mortar Batteries it is interesting to note that the 21 cm. Howitzer Batteries, which at the commencement of the War were provided with four guns, were split up into batteries of two guns when trench warfare commenced. This was found to be insufficient as in the case of disablement a battery might be reduced to one piece. Accordingly, in 1917 the Mortar batteries were increased to three pieces.

12. Heavy guns for heavy long range harassing fire were placed directly under the command of the Army Group. To this category belonged all guns over 15 cm.

13. For the purpose of organising heavy long range harassing Fire the High Command granted to the Heavy Artillery General at General Headquarters on the 2nd December 1916, a special Staff Officer. From September 1917, this post was called "Staff Officer of Artillery for Heavy Long Range Fire" and finally dissolved on 13th August 1918, when these functions were taken over by the Operations Section of the High Command. The Staff Officer for Heavy Long Distance Fire at Great General Headquarters collected all the necessary information and put forward any questions of principle, through the Inspector General of Artillery to the General Commanding the Army Group. He acted as Army Group Technical Adviser for all technical and ballistical questions and arranged for the bringing into action, removal, and firing programmes of all Heavy Long Distance Batteries. He kept the Army Group Commander informed of the advance in the building of positions and railways for the heaviest guns and was responsible for the training of the batteries and gave lectures on shooting as and when ordered by the Inspector General.

14. The Senior Artillery Staff Officer with an Army Group made all arrangements in the peaceful periods for putting into operation Heavy Long Distance Fire Batteries. As soon as an hostile attack occurred or a German attack was planned, a special staff for

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Long Distance Battery and destruction work was attached to the Army concerned. This staff received the reinforcements of one Officer from an Artillery Ranging Section, one Railway Officer and one Surveyor.

15. In order to provide transport for horseless batteries, Heavy Artillery Mechanical Transport Parks were provided for at first seven armies, about the beginning of 1916, and later for three additional armies, and in the last year of the War, on account of the lack of horses, regiments had been regularly equipped with motor transport.

16. The use of Heavy Artillery in mountains was made possible following the Serbian campaign by the introduction of 34 special Heavy Artillery Mountain Columns with whose assistance the Heavy Artillery was able to reach otherwise unattainable positions in the firing line.

17. The transport was obtained as occasion demanded from the mechanical transport troops present with the fighting troops who were able to load on their 48 wagons the ammunition, A tubes, and carriages of the heavy batteries. Detachments of Heavy Artillery were also found in the Infantry trenches. From 16th June 1915, up to 11th February 1918, eighteen Revolver or Trench Gun Sections were provided with personnel from the Heavy Artillery and Infantry. At the same time that Field Artillery batteries were provided with machine guns, each of the Heavy Artillery batteries were provided with two machine guns.

AMMUNITION COLUMNS.

Field Artillery.

1. At the commencement of the War the First Line Ammunition Columns were part of the Field Artillery Regiment. Each brigade was equipped with such a column which bore its number. Constant changes of Divisions and over-loading of the railway soon resulted in the removal of the ammunition columns from the brigades, and under the pressure of the conditions of trench warfare these became Army Troops.

2. On 20th January, 1916, they were placed at the disposal of the staff of the Lines of Communication and re-numbered with Army numbers. The number of these ammunition columns reached 785. When the great offensive in France in 1918 brought moving warfare into being again, the First Line Ammunition Columns were then attached to separate brigades but retained their army numbers.

Heavy Artillery.

3. At the commencement of the War each Heavy Artillery Battalion was provided with eleven Munition Columns, and in addition was a Main Ammunition Column which contained eight sections in the case of Howitzer Battalions and four in the case of Mortar Battalions.

4. On 9th May, 1915, the whole of these existing Ammunition Columns were dissolved. Instead of these, each horsed Heavy Battery received one Heavy Artillery Ammunition Column, while the

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remaining ammunition columns were given army numbers, handed over to Army Commands, and served in the reserve for the un-horsed batteries. These columns were attached to batteries as soon as the latter received horse equipment, so that finally only twelve Army ammunition columns remained independent.

Siege Workshops.

5. Seven siege workshops were available at the commencement. These were soon insufficient with the great increase in Artillery. Their number was increased to ten and in January 1916 Mobile Workshops were introduced.

6. On 4th June, 1917, by order of the High Command, the following decree was published :—

Siege Workshops were to serve as the main Artillery Workshops and each Army was provided with one, Nos. 1 to 17 and Bavarian Nos. 1 to 4.

New equipped Artillery Infantry workshops were provided in certain instances for the Army Groups and their number reached 57.

The Mobile Infantry Workshops were increased to 27 and formed an Army Group Reserve available for despatch in case of sudden demand in any one place. For this purpose they were taken into action by railway wagons or motor lorries.

(Table referred to).

BATTERIES HEAVY ARTILLERY.

	Batteries.	Siege Companies.
General Headquarters	3	
1st Army	12	
2nd ,,	34	including 14
3rd ,,	14	,, 2
4th ,,	16	,, 4
5th ,,	20	,, 8
6th ,,	24	,, 8
7th ,,	9	
8th ,,	12	
Northern Army	4	
	148	including 36

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"DUNCAN" ESSAY, 1922-23.

Subject to be chosen by competitor, but it must be a serious discussion of some up-to-date question connected with R.H. and R.F.A., or it may be a tactical or technical Field Artillery study based on lessons of the Great War.

MUTUAL OBLIGATION OF FOOT AND GUNS IN MOVING WARFARE.

By CAPTAIN BT. MAJOR W. E. DUNCAN, D.S.O., M.C., R.H.A.

"Vide ut Vincas."

(Recommended for publication).

"Oh, would some power the giftie gie us
To see ourselves as others see us."

This couplet has been handed down to posterity by the great Scotchman, as a reminder to the self-satisfied in all classes of life. I cannot but think that, had he been a soldier, he would have added :—

Would that God would gie us, too
The other fellow's point of view.

It is clinging to this theme that I venture to turn over once more ground that has been harrowed by many a conference of all arms, and passed through the mesh of the compilers of the post-war training manuals. But the references, in these books, to co-operation are of necessity in general terms. I now attempt to amplify and further dissect but in no case to contradict Field Service Regulations.

Before taking an important step, the commander of the infantry and artillery must both consider how his plan will affect the other, how it will affect the troops operating on either flank, and how the enemy will construe it.

On receiving any important information, he must by means of a perfected system of communication, at once inform his colleagues of all the facts which will help them to view the situation as he views it. In fact, he must develop the cult of "the other fellow's point of view," so that his friends know as much as himself of what is happening, while he loses no opportunity of conveying a false impression to the enemy.

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It is in the moving battle that these problems assume their most perplexing aspect. Three years of abnormal trench warfare have left their mark upon our ideas, and may have lulled some of us into the comfortable illusion that quick decision and immediate action are seldom called for. If that is what trench warfare has taught us, let us forget that it ever existed. But those who have learnt their lesson rightly know that there are many of the refinements of trench warfare which can be introduced into the encounter battle, and the side which makes greatest use of them, without hampering its mobility, will obtain a decided advantage.

Infantry and artillery must work in conjunction while carrying out the initial reconnaissance on gaining touch with the enemy; they must fight in complete unision when the battle is engaged. To do this, neither must cease for a moment to improve every possible means of communication.

These seem to be the three natural divisions in which to consider the subject—co-observation, co-operation, and communication.

I. Co-observation.

Preliminary reconnaissance.

The infantry officer, while carrying out his own personal reconnaissance of the country to be fought over, gains much information which will be valuable to his supporting gunners. Even more so the gunner with his accurate instruments for resection and rangefinding should be able on completion of his reconnaissance to provide details which will be invaluable to his infantry.

The ideal is that representatives of both arms should carry out the preliminary reconnaissance together.

When a force is advancing for action the intelligence officer of the Infantry Brigade should, in company with a selected officer from the covering artillery brigade, go forward with the advance guard to prepare a report on the country over which the battle is to be fought. A skilled surveyor, from the survey section, will in future be available to accompany this reconnaissance party.

As soon as the advance guard is forced to deploy, and a serious engagement appears imminent, these officers should select the most suitable point of vantage for observation, and should proceed to "tape" the country.

As a result of their labours when batteries and battalions of the main body receive, late at night, orders for an attack at dawn over country which they have scarcely seen, they receive also a tabulated chart.

The information in this chart is as follows:—

(i) A list of prominent points in the zone of operations, giving their map references or co-ordinates, with sufficient description to enable the point to be easily identified. This list may even give names to the points and code names, provided that the circulation of the list is general throughout the formation:—

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Example.

Description.	Map Reference	Name*	Code Name*	Remarks.
Red House with large pump at doorway.	LE CLERQ FERME 95.20		LCQ	Enemy seen working here 5 p.m. 23.3.23.
Nine prominent trees standing alone on the hill.	Not shown but at 85.20	NINE ELMS	ELMS	The Northern tree is trigonometrically fixed as 308563·5 E. 192047·3 N.
and so on				

* These names and codes only to be used within the { Division. / Brigade.

(ii) *An improved Map.* In cases where only a half inch map is available, this party could prepare in a few hours an enlarged map to scale of 1/20,000 with "trig. points" which have been fixed by the surveyor, and possibly the position of bearing pickets which he has set up.

This map will provide sufficient data for batteries to fix their own positions and to fire a barrage at dawn from the map should one be required.

Fixed procedure for observation.

Although it is most desirable that a ready-made reconnaissance should be available, no regimental officer has the right to demand it. He must carry out his own on similar if less technical lines.

In defensive positions, and in attack too, units will constantly be in positions of observation. It is too late to commence observing when enemy movement becomes visible.

It is a stereotyped universal procedure for "taping" the country that I wish to urge for all observers, be they infantry lookout, machine gunner or artillery observer.

A few born observers exist. They are gifted with a sense of direction and a bump of locality. They look at a map, then they look at the ground, and every point is identified correctly.

These genii are a stumbling block and a public danger, for others, less gifted, attempt to copy. The average observer had best work on the following lines :—

First, determine accurately (either by detail on map, or better, by resection) your own position. Next, select on the ground likely to be fought over a definite object, which will be marked on the map, to serve as a reference point. A church or a cross roads, easy to pick up and in the centre of the zone, will serve the purpose.

Take the bearing of this reference point, and if a range-finder is available take the range to it. Tabulate results in your note book.

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Now consider the foreground to the left of the reference point and note each point likely to be a feature on the map. Measure (with graticules or hand) the lateral angle from the reference point, and take the range. Then treat the foreground to the right in a similar manner, and after that back areas.

Now turn to your map—not a crumpled paper drawn from the trouser pocket, but a carefully prepared folding map board. Place the protractor at the position of the observer, and by means of the true bearing and range already recorded identify the reference point on the map and from it the other points noted. Fill in the name and map reference of each point in the column provided for it.

Now go over the front once more, noting objects not likely to be marked on the map, but which are prominent land marks; it may be "three pine trees," "Michelin notice board," or "group of new cottages." By range and angle fix them on the map and fill in their co-ordinates.

This complete procedure can be easily carried out in under 20 minutes, and no observer should sit down to wait for the enemy until it has been done. In all our retirements in the late war, from the withdrawal from Mons to the retreat of March, 1918, long waits for the enemy occurred on successive lines of defence.

These tabulated results are invaluable both when engaging targets and when preparing reports. Moreover, if extracts from these tables are given to infantry officers about to advance, it may help them greatly to fix their position when smoke and bullets prevent them from taking their own bearings.

Observation of Fire.

I now wish to touch on observation of artillery fire, for here also the infantryman can assist his gunner.

It is the happy exception for the artillery observer to be able to see his whole zone from one point. The best he can do is to establish a central observing station comparatively near his guns, and from here, like the octopus, through out tentacles, each with an eye at the end of it for watching special areas of dead ground. That is easy enough to state, but two prominent difficulties present themselves. There are only a limited number of trained eyes which are not engaged in some other work, and the appliances for communication are restricted by lack of transport.

How are we to find eyes that can not only see but also observe? It is true that a certain number of artillery non-commissioned officers can be trained to observe excellently, but they also have duties to perform at the guns.

In 1916, I had the good fortune to be covering for a long period one of the battalions of the Rifle Brigade. During their time off duty the officers of one company spent hours at the artillery observation post, and by July 1st any of them would have been capable of ranging a battery. An arrangement was made whereby in the advance any of these should signal back to a central observation post. Their message

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was to be acknowledged by a Very light fired from near the observation post, after which they could signal demanding fire and if necessary range for themselves. Unfortunately, owing to their complete disregard for their own personal safety during the first advances, all were either killed or wounded.

The telescope.

Before leaving the subject of observation, I must say one word in favour of the telescope in spite of its weight. You may scrutinize a district, be it never so closely with field glasses, and there is nothing to report. Survey it once more with a good telescope in a good light. One is reminded of looking at an apparently innocuous piece of cheese through a microscope. Everything begins to crawl. Enemy detachments may be seen creeping along a hedge. The wheels of a concealed gun poke out from the edge of a wood, and ladders and heads appear above the tops of haystacks. Besides, in observing fire for effect, a telescope shows up the fall of each round most accurately. It is well worth the extra four pounds weight.

Reconnaissance of ground. The key to success.

I have dealt at length with observation for I feel that a battlefield intelligently observed in conjunction, by supporting rifles, machine guns and guns, soon becomes the scene of a victory.

When at school, I thought that Cæsar's "Veni, Vidi, Vici," was but a meaningless boast, and was disappointed in him. In the light of events in the late war, I now construe it "I came, and because I observed, I conquered."

Co-operation.

The infantryman wins the battle and the guns help. That is admitted. How can the guns best help? How can the infantry best help the guns to help? These are the problems of co-operation. The artilleryman must gain the confidence of his infantry. To do this he must not only convince them of the possibilities of artillery, but also reconcile them to its chief limitation—the error of the gun.

Whenever I attempt the latter I have the uncomfortable feeling that the story of the bad workman may be flitting across their brains.

The analogy of the bowler at cricket sometimes meets with success. Supposing some expert of precision such as J. W. Hearne, were asked to pitch 100 balls in succession on the spot of whitewash which one puts down to mark a good length ball, he would rightly claim that it was imposible, but would probably guarantee to pitch 50 out of 100 within one foot either way, and all hundred, allowing for a possible loose one, within 4 feet either way.

That is, his 50% zone would be 2 feet and his 100% zone would be 8 feet. Were he told to bowl from 50 yards his zones would become much larger. An automatic bowling machine would also have these zones. Similarly, owing to interior and exterior variations, guns have a 50% zone of about 1 yard for every 100 yards

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of range. But both bowlers and guns find it easier to keep direction than to keep a length, and the breadth zone of a gun is one tenth only of the length of zone.

The question may come "why did the Germans appear to have so much smaller zones of error"? The answer is that, preparing for a war, they spent years in manufacturing, grading and testing propellant gun powders, while the majority of our cartridges were filled with the handiwork of munitionettes working overtime.

Value of Enfilade.

But the question of the breadth zone being small and the length zone large, raises the question of enfilade, which is the essence of co-operation in attack or defence.

If the guns can manœuvre to shoot at right angles to the advancing troops, or if the attackers can arrange to "go in" at right angles to the line of artillery fire, not only does one gun do the work of ten, due to the cone of dispersion of the shrapnel, but the edge of the barrage is one tenth as ragged due to the small breadth zone of the flank guns. These facts are almost platitudes, but they cannot be over emphasized in planning attacks.

Anti Tank responsibility.

Until some other method of dealing with tanks and armoured cars is evolved, the guns must be responsible for this duty. Four-gun batteries can ill spare single guns for this purpose, and it is likely in the event of a war against a highly equipped enemy, additional anti-tank units would be improvised, or pack artillery allotted to formations.

Observed fire whenever possible.

It should be, and is, a point of honour with all good gunners that unobserved fire will never be provided when observed fire from ground or air can be given, but occasions arise when observation is impossible. The guns must then be prepared to provide unobserved fire from the map, and the infantry must conform to a time table.

Co-operation in engaging targets.

Although the plea of waiting for the co-operation of other arms will not hold where resolute individual action is demanded, there are cases where the effects of co-operation justify a slight delay.

An artillery observer sees a company of infantry halted behind a wood, 500 yards from our advanced posts. The inexperienced officer will range, at once, with his one battery and commence such fire for effect as he can produce. If his shooting is good he will perhaps hit ten men before the company disperses.

The observer with the broader outlook, although ready to act at once if necessary, despatches his assistant to inform the nearest Vickers post and company headquarters. He then selects a witness point some 300 yards from the target, on which he ranges.

This is likely to amuse his victims rather than disturb them. By the time he is prepared for a small switch and fire for effect, there are probably several Lewis and Vickers guns trained for a concerted effort.

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Representative of guns must be forward.

I consider it essential that not only should there be an artillery liaison officer with battalion headquarters, but there should also be an artillery representative, capable of and in a position to observe fire, somewhere (in front of battalion headquarters) on every brigade front.

Officers are scarce, as I have said before, but if they cannot be found, a trained N.C.O. should be detailed. However good observation may be from behind, it is worth much to have an observer with the infantry. If things go right, nothing cheers the infantry soldier so much as to be pointed out a detachment or stronghold of enemy infantry being well shelled. If things go wrong and shells drop short, he can see that the artillery are not merely indifferent, and that someone is attempting to right matters. Besides it often appears that things are going wrong when they are not, and an intelligent gunner on the spot can usually make this clear.

Smoke.

Although used with great effect in the latter stages of the war, the howitzer smoke shell has not yet come into its own. On those occasions when the artillery are asked to "blot out" a whole hillside or the edge of a large wood, it is often possible to say "there is scarcely enough ammunition available even to neutralise such a large area, but with a 4·5″ Howitzer battery firing smoke I can completely blind its view.

This will usually be found to serve the purpose. It is to be hoped that smoke shell will shortly form a large proportion of the ammunition normally carried by howitzer batteries.

Close up guns.

Although the use of guns in the role of machine guns or trench mortars, is to be deprecated (especially if only 36 18-pounders are to be available in a division), I do consider that one or two howitzers on a divisional front, kept close up to the support line, do such useful work in local co-operation that the risk is justified. I have known a section of howitzers kept in a farmyard within megaphone control of a forward O.P., which were invaluable in times of stress when lines were cut and fire badly needed. Further, there is no doubt that it is possible to take risks in mobile operations which would mean certain extinction by hostile fire in position warfare. These forward guns form wonderful rallying points for infantry, and are by their position potential tank destroyers in the case of a break through.

How infantry can help the gunner.

I now turn to some of the obligations due from the infantryman to his gunners.

The infantry commander must, through the medium of his liaison officer, keep his gunners informed of all his dispositions and of movements which he is contemplating. He must consider the question of the limited ammunition supply of the guns during movement.

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Moderation in demanding fire.

The artillery cannot "turn on the tap" of barrage fire whenever required for longer than a few minutes at a time, and still have ammunition to draw from. A battery, if kept at rapid fire, would exhaust all ammunition in front of railhead in one hour or so, and no more might be available for two days.

On occasions when the mobile state is freezing into position warfare, and only an assault under a protracted barrage will break the ice, then that barrage will certainly be provided, but the guns must have sufficient warning to be able to dump ammunition and bring up more. The infantryman must realise that the creeping barrage can only be the rare exception.

Consideration for Artillery observation posts.

If infantry officers will teach their men to respect and avoid artillery observation posts except when there for a purpose, it will help the gunner observers enormously. Time and again it appears that the ideal places for cookhouses and ablution points coincide with those selected for observation posts, but the gunner has a just claim that these important functions and even the machine gun requirements as well should sometimes give way, and yield to him the only spot for observation.

Distinguishing Patches.

Distinguishing patches on the backs of the tunics of infantry are of greatest help to artillery observers, if disfiguring to the dress itself. An infantry officer once told me that he liked having a red bullseye on his back as it stifled any inclination to face the wrong way. Be that as it may, it not only distinguishes friend from enemy, but also the actual unit to be identified.

Wirecutting

I do not think it advisable for infantry to demand that wire defences should be cut by field guns. There is little doubt that such wire as may be met with in moving warfare could be dealt with at definite points by a moderate expenditure of 4·5″ howitzer 106 fuzed shells; but the time taken and the points engaged deprive the subsequent operation of all elements of surprise.

Communications.

I have neither the space nor the information to write a dissertation on modern communications during moving warfare. This would form a subject for itself. Since, however, communications are the arteries through which the life-blood of all co-operation must flow, I wish to refer to the various means and their merits.

Wireless.

In these days of "broadcasting," our thoughts at once hail wireless telegraphy and telephony as the solution of our difficulties.

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Military wireless is still the luxury of the great. It is now adopted as the only means of communication between brigades and divisions, and "jamming" difficulties restrict the number of sets used on a small frontage.

But the time seems nearly ripe when the great proletariat of observing officers, signallers, and linesmen, tired of waving flags, should rise in wrath and force the inventors to overcome this difficulty, and admit of wireless talk between observers and their guns.

The objection to having to send in code has been overcome by a mechanical instrument which decodes at an amazing rate.

However, a writer on "how to play the piano" connot advise buying a pianola; neither can we in discussing how best to use existing means of communication say "use wireless." I class power buzzers, etc., under the heading of wireless.

Field Telephone.

The field telephone, if wires are laid by well-trained men, is the most reliable means of communication, and lines should be laid where possible between infantry and artillery headquarters during pauses in movement. Even this should be regarded as a luxury, and all other means of communication should be developed.

Flags and Discs.

Flags are difficult to operate in the forward areas without exposing the operators, either sender or receiver. I consider that the eight inch shutter discs are preferable for short distances, and are particularly useful for attacking infantry and forward artillery parties sending messages to the centre observation post. A code for co-operation on the lines of the Artillery code, would make visual signalling quicker and more reliable than telephone.

Electric Lamp.

The daylight signalling lamp proved its worth a thousand times in the last months of the war, and should be cultivated for use between battalions and brigades of artillery.

Hand Semaphore.

I consider that it should be impressed on all platoon and section commanders that if the supporting gunners are doing their jobs, there will be somebody watching their advance provided the ground lends itself for observation. If a party left high and dry in an advance, signal back their wants in semaphore, standing against a suitable background, it is not too much to expect that an unseen gunner observer will read and supply the need or communicate with those who can.

Light signals.

Anyone who took part in the retreat of 1918 will remember the German system of informing their artillery of the position of their foremost infantry by the firing of Very lights. One does not advocate

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this system, since, when in doubt whether to shell a certain village or wood, one's mind has been set at ease by the appearance of lights from it.

But definite pre-arranged light signals carried by various responsible people (forward artillery parties or company headquarters) and fired to show the capture of definite objectives are of the greatest aid both to artillery and staff.

The medium of the air.

The R.A.F. have made such wonderful progress, that in a few years the aeroplane will be the normal medium for co-operation just as the Post Office is for correspondence. We will merely tell our message to the air in certain faith that it will be delivered almost immediately at its destination.

Now that aeroplanes heed neither rain nor snow, fly in any wind up to 70 miles an hour, and can observe at night, their range of usefulness is immense. The Popham panel, already most practicable, will doubtless be improved, and all that is required is constant practice in peace time.

Conclusion.

In the preceding pages only a few of the ways and means whereby each arm can help the other have been suggested. There are without doubt many more important instances which have been omitted. But it is on the principle that success depends, the principle that if each thinks more about giving assistance than taking it, each will automatically receive more help.

I think that this pulling together could be encouraged more in peace time. Regimental esprit de corps needs no fostering, it is red hot in any unit worthy of the name. I should like to see more Divisional enthusiasm. I should like to see Bombardier Jones performing more often at inside left with Colour Sergeant Smith on the wing, both cheered by foot and guns.

Anyone who has read Kipling's "Ship who Found Herself" will remember how each strut and bolt of the structure grunted and complained that on it alone all the strain fell, and that the other shirked its work. It was not till the full "dirty weather" of the Atlantic had been faced that the ship spoke with one voice and forged ahead overcoming all obstacles. With our post-war army we should be able to improve on this and ensure that divisions find themselves before they face the buffetings of war.

They should leave harbour one compact, confident body.

"VIDE UT VINCAS."

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SOME THOUGHTS ON CO-OPERATION.

By MAJOR J. E. T. YOUNGER, R.A.

FIELD Service Regulations lays down, as one of the principles of war, that "only by effective co-operation can the component parts of the fighting forces of a nation develop fully their inherent power, and act efficiently towards success."

Indeed, all our training manuals, written in the light of the experience of the Great War, are similarly insistent on the necessity for co-operation.

The subject was given prominence in pre-war manuals. This prominence, however, was not very largely reflected in the operations of the British Expeditionary force during the first days of the war. We went to war with an imperfect grasp of the full meaning and, above all, the practical application of co-operation.

It is doubtful whether the advances made in this sphere since those days are in proportion to the opportunity for improvement which the war afforded. We do not, even yet, speak the same language in the various arms.[1] What were the causes of our shortcomings in 1914, as far as the infantry and artillery are concerned?

Before the war co-operation remained to an excessive degree in the sphere of text books and manuals, of lecturers and theorists.

Its importance was announced by senior officers. Junior officers vaguely spoke of it.

Co-operation, however, never descended to the realms of practice and of every day life. It had not become an instinctive habit with every officer when engaged in practical tactics, during battery or brigade training, at practice camp, or on manœuvres.

Consequently, at manœuvres and on field days the infantry officer usually had but a vague idea of how to deal with the artillery supporting him. Equally, the artillery officer had an imperfect notion of what the requirements of the infantry were. The two did not co-operate as a matter of course, with the spontaneity born of habit and tradition.

The presence of infantry officers at practice camps seldom contributed much towards fostering the habit of co-operation; they were too frequently left to be passive spectators. No opportunity was afforded them of taking an active part on tactical days, and of obtaining a real grasp of the difficulties and problems of the gunner, in so far as they affect the infantryman.

Before making any concrete suggestions, it would be well to put forward one or two general considerations of the matter.

[1] Written before the instructions issued with Army Orders for February 1923 had been issued It is important that these should be carried out, and should lead to further standardisation.

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Co-operation is largely dependent on knowledge; ignorance is its greatest enemy. This implies a sufficient knowledge throughout each arm of the methods, problems, and limitations of the other arm.

Co-operation is, in a high degree, a personal matter. The human element figures very largely in the picture. The military education and training of the individual must aim at making co-operation spontaneous, an instinctive habit of every officer on the battlefield. It cannot be ensured by orders and instructions, which the course of the battle may render impracticable.

Each arm must realise that, individually, it is no more than a means to an end. Long spells of peace are apt to obscure this truism.

Do we keep in mind why we strive to hit the target at practice camp, with the battery's reputation vividly before us? In most cases it is to satisfy infantry requirements. But the infantry only exists in the imagination, and it is apt to be a case of "out of sight, out of mind," with other pressing matters to attend to.

We must not forget that practice camp is a final stage of training, as well as a test of the efficiency of a battery.

Let us consider how we are to proceed in the future, in order to avoid falling back into the easy-going conditions of pre-war days. It is certain that, in the next war, a considerable superiority will stand on the side of the nation which has fostered the spirit of co-operation in the individual, and has made it a traditional feature of his military life.

A continuous policy is required, conducive to automatic application by every officer of the precepts of books and lecturers to the control of any military operation, however small, in which another arm plays a part.

This is a counsel of perfection, the approach to which can be advanced by a variety of means. Had the contemplated move of "The Shop" to Sandhurst taken place, an important step in the desired direction would have been made. For the benefit of junior officers, however, it is suggested that commands should arrange annually a series of schemes, to be carried out in combination by infantry and artillery officers. These schemes would be specially framed to necessitate the fullest measure of co-operation throughout.

The attachment of officers of the respective arms to units of the other arm is productive of better mutual acquaintance, and is capable of being made most instructive, if properly exploited. Unfortunately, it is apt to happen that officers can ill be spared by their units at the time when attachment to the other arm would be most advantageous.

Every effort should be made to facilitate the attendance of infantry officers at practice camps. Their activities, however, should not be confined to watching shell burst through their glasses. Visits to the target end are of great value, and are encouraged by the artillery. Mutual benefit will be obtained if they represent the infantry commander on tactical days, choosing infantry headquarters, discussing means of sending back information and of communication, and so forth.

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The personal element, which no theory can replace, is thus introduced.

The infantry officer becomes accustomed to carry out his share of the bargain, with the gunner's point of view prominently before him. He learns the effect of artillery fire, the conditions under which this fire is most effective, and the limitations to which it is subjected.

A similar opportunity can be afforded to the gunner officer by attendance at field firing, battalion training and other suitable exercises.

The occasion for the extended application of experience thus gained is supplied by tactical schemes, field days and staff rides.

Instead of holding isolated courses for "Officers of other Arms" at schools of instruction, it is suggested that better value would be obtained by forming "Co-operation Courses" of officers of both arms, or indeed of all arms. These courses would visit the School of Artillery, the Machine Gun School, and the Small Arms School, following out a programme drawn up by the General Staff.

The Senior Officers' School would form the final stage of permeating the officer's military faculties with the spirit and application of co-operation.

A system of peace-time stations, designed so that no unit is isolated from units of other arms, must tend to make the measures outlined above more effective. Detached seclusion during peace does not conduce towards co-operation in war.

All these expedients should find their consummation in the annual manœuvres. It is here that the personal and human elements, which are really the essence of the whole matter, will find their full scope.

The test of manœuvres must be utilised to indicate how far theory has been translated into matter of course practice. Opportunity will also be afforded for ascertaining whether or not the arms are tending towards living beside each other in water-tight compartments. Such an existence produces itself unless continually counteracted, and is fatal to effective co-operation.

In these notes, co-operation between artillery and infantry has been uppermost in the writer's mind. Many of the remarks and suggestions, however, apply with equal force to co-operation with the other arms. No modern gunner can let his thoughts run on this subject without the Air Force figuring very largely in them.

Co-operation between the artillery and the Air Force is a question of great moment. It is capable of considerable development. Many of the expedients in use at present are primitive, and subject to extensive improvement and simplification.

One of the main limiting factors is communication. When science produces a reliable means of vocal communication to and from the aerial observer, a decisive advance will be made.

Under present conditions of communication the elasticity which this will bring is wanting.

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Rigid adherence to a code of rules laid down in peace time and to instructions issued in advance in the field is imposed upon us for the time being.

For this reason, and because of the future possibilities of this branch of co-operation, the closest personal liaison between the Artillery and Air Force is required, both in peace and war.

Although we are told in artillery training that "artillery must not look upon the aeroplane and balloon as essential to successful counter-battery fire," a vital advantage must be conferred on the artillery which possesses a means of observation from the air as effective as science and peace-time training can make it. Accuracy of fire is essential to the development of the full power of artillery with minimum expenditure of ammunition; this accuracy depends upon good observation. Predicted shooting cannot yet claim to rival observed shooting, especially under conditions of moving warfare. For long-range fire, particularly, the benefit of observation from the air, vertically above the target, is obvious.

The Air Force performs two distinct functions for the artillery :—

(a) Reconnaissance and intelligence.
(b) Observation of fire.

Both these functions require considerable technical artillery knowledge on the part of the Air Force. This cannot be acquired and effectively used without a thorough and well thought out system of peace-time training and liaison.

In addition to courses at the School of Artillery and the School of Army Co-operation, it is suggested that observers should be attached to batteries, so that they may appreciate the difficulties and delays which hamper the artillery. They should not only observe shoots from the air, but should also watch the procedure at the battery O.P.

If, however, Air Force observers are to develop their full effectiveness, the artillery must offer them batteries highly trained in drill and fire discipline. Battery commanders must be able to appreciate conditions and circumstances which hamper the aerial observer. Ignorance on either side conduces to misunderstandings.

The very nature of the work makes it susceptible to difficulties and disappointments. This indicates that the closest personal touch between the artillery and Air Force is all the more necessary. It is, furthermore, only by such relationship that the great future prospects of co-operation can be fully developed.

It is not desired to enter into the highly controversial subject of the separate control of the Air Force. But the existence of a separate controlling authority points to the necessity of continual attention to collaboration on the part of the respective high commands.

The fact remains, however, that the practical work in the field is carried out by the regimental artillery officer, the counter battery staff officer and the Air Force observer. It is, therefore, most necessary to bring home to these officers the importance and future

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possibilities of co-operation, so that additional impetus to its development may come from them.

The definite affiliation of Air Force units to each divisional artillery for co-operation and training would seem to be a most desirable and profitable form of peace-time organisation. Annual reports and suggestions from each division, forwarded to the Military and Air Force General Staffs, would provide a yearly supply of information concerning the results of practical combined work. Such information would form valuable material for the progressive development of our organisation for co-operation.

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MOUNTAIN WARFARE.

By MAJOR H. N. H. WILLIAMSON, D.S.O., M.C., R.F.A.

Although the principles of war are neither numerous nor in themselves abstruse, the application of them is difficult and will vary in accordance with the circumstances of each case.

How have the tactical principles in mountain warfare against an uncivilised enemy needed to be modified from those of normal warfare?

In what respects have tactics employed in mountain warfare changed in the past few years, and why?

TO quote the authority of the Mountain Warfare School at Abbottabad, let us refer to the subject throughout as "trans-border warfare," and endeavour to adapt some of the teachings of that establishment to the pursuit of the subject, as demanded in this essay.

Before looking very far we find a statement which presents an apparently direct contradiction to the assumed answer to our question as originally asked, viz. :—

"The fundamental principles of all warfare apply with NO reservations to transborder warfare." But before going much further we find the key to the apparent difficulty which is backed by the actual quotation from Field Service Regulations, Volume II, 3 (i) :—

"No two situations are identical and therefore the application of the principles cannot be made subject to rule."

Let us therefore accept the principles as unchanged and unchanging—for the military records of all great conquerors have proved the case—and rather let us investigate the special nature of the circumstances under which "transborder warfare" is waged, and which necessitate such special rules for the application of the aforesaid principles as the experiences of our troops, British and Indian alike, have found necesary to adopt throughout the constant succession of small expeditions and encounters on our North West Frontier during the last half century.

To do this exhaustively is beyond the scope or requirements of this essay, and so, for the sake of brevity it is proposed to divide the period under scrutiny into two parts. The dividing line selected is as nearly as possible the moment during the great European war, when, owing to our other commitments, all control passed from our hands over the quantity of up-to-date rifles and ammunition which came into the possession of our transborder foes, when their ranks were already beginning to be swelled by deserters or prisoners from our own regiments, who after being recruited in transborder districts, and trained under British supervision, made good their escape to their

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own native hills, and when the quality of our own troops—more especially the British ones which were relieving the original Frontier Force regiments then urgently required elsewhere—had sunk far below the pre-war standard.

Now for the principles of war themselves :—

(1) Maintenance of the objective.
(2) Offensive action.
(3) Surprise.
(4) Concentration.
(5) Economy of force.
(6) Security.
(7) Mobility.
(8) Co-operation.

Without keeping these fixed in mind and subconsciously using them as the basis of all military thoughts or actions, it is of small avail to be in possession of a set of rules for their application to the abnormal form of war which transborder warfare undoubtedly is.

The main condition which justifies the qualifying epithet of "abnormal" is as existent to-day as it was 50 years and more ago; and the division of the period under discussion as indicated in the foregoing paragraphs has hardly affected its action upon the troops engaged.

This condition may be called "transborder loneliness."

It is caused by the immensity of the area operated in (vertically as well as horizontally); by the smallness of the units into which the battalion, the company and even the platoon is split up, and in which it has to go into action at considerable distance from its nearest source of support; by the feeling that failure on the part of one of the smallest of these units may have the direst results for all the other links in the scheme however distant they may be; by the almost uncanny invisibility of the enemy; by the absence of all fixed flanks, and of any definite positions in which the enemy may be expected to be found and forced to give battle.

The very personal qualities of the enemy, so different to those most natural to ourselves, make us feel that we have lost the initiative almost from the start. He fights by instinct purely like an animal, he knows every yard of his ground, he moves quickly and silently, and relies almost exclusively on surprise; he is unhampered by considerations of transport.

No wonder that a feeling of "loneliness" descends on the young soldier from the plains of the Punjab or Rajputana, the cockney from Kensington or the yokel from a Yorkshire Riding.

"Transborder loneliness" has always existed and always will, but it must be fought against, and can be overcome; firstly by a persistent application of the principles of normal war which must subconsciously influence all our personal actions, and secondly by the fixing of a lasting impression on our minds of the modifications of those principles and their application as enumerated in Field Service Regulations, Volume

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II, Chapter XIV. In this Chapter particular stress is laid on the leading characteristics more especially necessary for transborder warfare; they are self-reliance, vigilence and judgment. These three are the keystones of an additional sense which all officers and men liable for transborder service must develop. This sense may be called the "spirit of suspicion." By use of this additional sense we try to defeat the enemy at his own game, in those animal characteristics which come so naturally to him but not to us. The full development of this "spirit of suspicion" puts its possessor into the strongest position. By its aid he will recognise instinctively the sinister possibilities associated with every natural feature in his vicinity, inanimate or alive, at rest or in movement, and what is more he will read in such possibility a tactical problem to which his brain subconsciously applying the "principles of normal war" will quickly give the answer in anticipation of any hostile activity which may subsequently develop.

And so, when this spirit of suspicion has been sufficiently developed it will be found that the moral inferiority resulting from "transborder loneliness" will have been entirely replaced by the moral superiority resulting from what may be called "transborder confidence," or the "lonely courage of the border."

Once this is obtained, the application of the first three principles of war to the operations as a whole is rendered incalculably more simple, for the main factors are now in our own hands, namely, moral superiority and the initiative resulting therefrom.

Having gone at some length into the main special condition of transborder warfare which has influenced the application to it of the principles of normal war, it will appear that most of the minor ones are more or less dependent on it; but whereas this condition is obviously a constant one, the majority of the others have been varied considerably in the course of time, and it will therefore serve us better to return again to our division into two periods which we will now refer to as "formerly" and "in the last few years."

Formerly we were immeasurably better armed, we were better shots, and our employment of fire was better organised than that of the enemy.

On the other hand we relied to a very large extent on manœuvring him out of his positions by the employment of several columns advancing on a broad front, and endeavouring to turn the flanks of his successive positions thus threatening his communication and causing a general withdrawal all along the front. This system, though less costly to us in men than a definite pitched engagement, never resulted in our inflicting sufficient casualties on him to comply with the "maintenance of the main objective" (Principle 1), i.e., the destruction of his forces in the field.

We were inclined to look upon him as such an artist in surprise and movement at night, that during the hours of darkness he was allowed to come and go as he liked, and no definite efforts were made to deny him this liberty.

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We were inclined to bring operations to a close by giving monetary or other concessions to the tribesman, and were content to accept any obsolete or unserviceable old weapon as part of a quantity of rifles whose surrender was demanded.

We clung to a system of rapid marches at great speed towards a certain objective, either personnel or a village; when this objective was reached, it was dealt with as demanded (or as more probably happened in the case of personnel) was found to have entirely vanished; we then withdrew our forces again and it was only during this withdrawal that the enemy would make his first definitely aggressive hostility felt; then by virtue of the annoyance and casualties which he would inflict on our rearguard up to the very gates of our original base, he would eventually leave the field fully convinced that he had been the victor.

Formerly the system of complying with the main general principle of transborder warfare (F.S.R., Vol. II, Ch. XIV, paras. 168, 165) was to picquet the lines of advance with troops furnished day by day from the advanced guard, and to withdraw these picquets as the move progressed. This left the line of communication in a most hazardous condition, and necessitated the supply of a sufficiently large escort for all convoys, to establish these temporary picquets again day by day, every time that supplies or ammunition had to be furnished. (Certainly this system of picqueting is as detailed in the up-to-date edition of Field Service Regulations, but as will be shown later a modification of the system has been found most successful in our latest Waziristan operations.)

Now, in the last few years things have altered greatly; principally on account of the tremendously improved efficiency of the enemy; and here as always the importance of the correct employment of the long range modern rifle, with plentiful supplies of ammunition now in the hands of a hawk-eyed and determined enemy, has been unpleasantly emphasised at our expense. Added to this the religious question involving the ethical correctness of killing of Mahommedans by Mahommedan, seditiously spread by the insidious method (another innovation in transborder warfare) of pamphlet propaganda amongst our troops, has made the obvious necessity for formulating new plans and new rules for the application of the principles of war.

But all the advantages of the last few years have not fallen to the enemy, for on our side we have at our disposal new mechanical appliances to counteract the superiority which unfortunately he has now definitely established in his fire employment and effect.

We have the Air Force for photography, bombing, low-flying and machine-gun work, and contact patrol.

We have wireless telegraphy to avoid the cutting of wires and the isolation of posts and detachments from all hope of succour; we have the experience of the immense value of a made road suitable for M.T. Transport of all sorts upon it, and we have the M.T. vehicles and the armoured cars for their protection to use upon it once the road is made.

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And now how are we making use of these advantages on our side to defeat the temporary superiority which we had perforce to surrender in the transition stage from "formerly" to the "present day"?

What modifications have been made to the application of the "principles of normal war" not only for the purpose of transborder warfare, but for the transborder warfare of the "present day"?

We have just concluded more or less successfully a campaign in Waziristan against the pick of the transborder fighters, and have taught them several lessons, while ourselves profiting considerably for the experience.

The principles of war themselves have been adhered to unflinchingly, but their application has in many respects been subject to the most marked innovations. Let us again take them separately and note how they have been applied to the present day requirements and assisted by present day resources :—

(1) Maintenance of the Objective.

The advance on a single line with communications permanently protected by carefully chosen and fortified picquets, enabled the force to advance towards its objective and to stay where it advanced to until that objective had been reached.

(2) Offensive Action.

This was continually undertaken by all parts of the force. Even the picquets and posts themselves raided the country close to them at the slightest indication of more than a handful of tribesmen collected together within striking distance.

(3) Surprise.

Following on the previous paragraph these raids were carried out at night when the tribesman in the light of former history expected us to keep inside our lines and leave him to roam the country at his leisure.

(4) Concentration of Superior Force.

This was effected by the reduction of the lines of communication and of the drafts required from the troops actually available on the day of battle, which formerly would have been required for the old system of picqueting on the march and continual protection of convoys day by day—while the main force was halted.

(5) Economy of Force.

As above, but many punitive operations were performed by the minimum personnel of the Royal Air Force with bombs, instead of by means of costly small actions by the infantry. Casualties were then diminished and more men available for decisive blows. Again, the advance on a single line economised men vastly for use on the single front whereon it was intended to operate and there only.

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(6) Security.

The defensive arrangements made for the permanent picquets on the line of communication linked up by an efficient system of communications, supplemented in some instances by wireless, were an important factor in security. The Royal Air Force also by reconnoitring areas were often able to discover hostile concentrations and to break them up, which would otherwise have involved loss to our infantry and possible disorganisation to the day's programme.

(7) Mobility.

This was increased by the use of motor transport on the line of communication, and by the rapidity with which the Royal Air Force could carry out a destructive raid at considerable distance and short notice.

(8) Co-operation.

Here again the Royal Air Force rendered invaluable work to all arms, whilst an improved understanding between the artillery and infantry appears to have been reached owing to the particular importance which this principle of all war has established for itself, and to the efforts made by all services to encourage it. Improved means of communication have greatly facilitated successful co-operation, and were made full use of.

The minor details of tactical employment of troops engaged in this our last transborder war, have not varied much from those taught in training for all open warfare. The leap-frogging or echelon system of carrying out all movements having as usual proved its value; but the necessity for the subconscious knowledge of the principles of war and the ability to apply them to the special cases of transborder warfare, as acquired by the cultivation of the spirit of suspicion appear to endorse the excellence of the various training manuals already issued on the subject for information, guidance—and action.

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THE ORGANISATION OF DIVISIONAL ARTILLERY.

A reply to a recent article

By CAPTAIN A. W. G. WILDEY, M.C., R.G.A.

THERE appeared in the R. A. Journal for January, 1923, an article on this subject outlining a scheme of artillery organisation which, while advocating certain very sound changes, fails to strike at the root of at least two present evils, and to produce an organisation which eliminates them.

The Author has, in the first place, neglected to visualize the effect that modern changes in tactics have had on infantry formations and the effect of those changes on artillery methods, and to deduce therefrom an organisation which will allow of these methods being properly carried out. Secondly, he has failed to notice, or at least has not attempted to eradicate, one definite fault in the present organisation of artillery, a fault which is exactly described by General Miles in a lecture reported in the February number of the R.U.S.I. Journal, when, referring to the earlier organisation of infantry battalions he used these words: "In such an organisation you do not get a well balanced and symmetrical arrangement: you get an organisation of the kind which, I daresay, is known to all of you as a pipe; that happens when subordinates are in succession, such as a chief, or a deputy chief, an assistant chief, or a deputy assistant chief, etc."

Let us look first at the tactical side of the question. Infantry tactics have undergone very great changes during the past six years. The increase in range and power of modern weapons has forced the infantry to adopt more open formations and a greater degree of decentralisation of command, with the result that the platoon is now the tactical unit and is divided into four sections, each a fire unit, two being rifle and two Lewis gun sections. The object of this organisation has been to make the platoon capable of reaching its objective, or maintaining its freedom of action in defence, by means of a combination of fire and movement *under circumstances which have for the time being deprived it of any form of outside support.* It has been made capable of providing its own covering fire, by means of either Lewis guns, rifle grenades, or hand bombs. One reason for this is that it was found, during the last months of the war, that during a forward movement there came a time when the infantry got so far ahead of its supporting artillery and that communications became so attenuated that instant response to infantry calls for help was not possible. By the time that such calls had filtered through the

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various formations to the guns the situation had altered; the operation had perhaps failed, or succeeded, or the point required to be attacked was no longer the decisive one and fire on it would therefore be wasted, in violation of the principle of economy of force.

The situation to-day remains the same. Infantry maintains the organisation by which it may provide its own covering fire. Artillery organisation remains as it was in 1914. There has been no modification in the organisation of communications which will enable the infantry *tactical unit* to obtain immediate support from its own artillery, and so help it to reach its objective with the least expenditure of its own vital energy, its own ammunition. It is true that towards the end of the war forward sections or single guns were pushed up in close support of infantry and did invaluable work in silencing machine guns and other hostile points d'appui. And it is also true that such forward elements of artillery are provided for in our latest training manuals. But what is so much more seriously true is that such elements *are not definitely self-contained artillery units;* they are on the contrary very definitely temporary improvisations, the detachment of which invariably entails a certain degree of disorganisation of the unit, namely, the battery.

This brings us to a criticism of the present battery organisation. We have seen the unit of infantry organisation grow smaller and smaller, and command become more and more decentralised until the section is now the fire unit and the platoon the tactical unit; companies and battalions are now, tactically, simply formations; units administratively only. Once the advance has begun, and in defence, once the position is assailed by the enemy, the power of any company or battalion commander lies only in the use he can make of his reserve platoon or company. In fully "mobile warfare" success or failure will turn on the decisions of junior infantry tactical commanders, provided those decisions can be immediately backed by adequate artillery fire. This can only be provided if the battery commander is in continuous close touch with the situation in the front line, and this touch is only possible if communication with the leading infantry is perfect. But the unfortunate battery commander has a dual responsibility, two definite tasks which he is expected to perform at one and the same time, though he is physically incapable thereof. He is both a tactical and a fire commander. Up to a certain point in a modern battle he is a fire commander only. He is allotted certain fire tasks by higher formations and his carrying out of them is only a question of fire control; tactics scarcely enter into the question. But there inevitably comes a time in every battle when command of artillery becomes decentralised down to battery commanders; when battery and even section commanders became little C.R.A's, whose first and foremost considerations must be the tactical handling of their units, according to the expressed requirements of the infantry which they are immediately supporting. They manifestly cannot be continuously in touch with the tactical situation if at the same time they are expected to order and

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control the fire of their guns. It will probably be argued that although he may not be able to see to the fire control of his battery in person, a battery commander can depute this task to a subaltern. True, but does not this entail at once a certain degree of disorganisation at a time when the battery is required to work with its maximum efficiency? To take any subaltern and place him in fire control of the battery means that a whole succession of changes of command takes place throughout the battery, that a section is deprived for the time being of its normal commander, that to fill the section commander's place, a gun loses its customary No. 1; disorganisation taking place throughout the battery to provide a temporary organisation to meet a definite and normal battle situation! Further complications arise if the battery is called upon, in addition, to find liaison officers, F.O.O's, or officers patrols. But again it may be argued that more frequently the battery will in such circumstances be split into sections, the section commanders becoming fire commanders, the B.C. being free to exercise his full powers as a tactical commander. But in this case can any one suggest that the original organisation of a battery into two groups, one mounted, the other dismounted, bears any relation whatever to two or three fire units and a headquarters? Again there must be a re-adjustment to meet a contingency.

Before suggesting any remedy, let us look at another side of battery organisation. General Miles denounces the "pipe" kind of organisation, what clearer example of the "pipe" is there than the organisation of a battery? In so far as there is a battery commander with two sections each commanded by a subaltern, the organisation is balanced. But what of the Captain and the G.P.O., who have no command? Administratively the Captain and tactically the G.P.O., are both sections of the "pipe." Consider for a moment the unfortunate Captain. He is the "quartermaster" of the battery, and as the battery officer commands nothing. Assuming that under normal circumstances he is a captain for ten years before being promoted, then for the greater part of those ten long years he is doomed to exercise no command or have any outlet for the display of initiative. He is an "assistant chief," carrying out his chief's policy; and even when his chief is away and he commands he must curb his natural desires and carry on that policy. Yet at the end of those ten years, when he is promoted, he is required to command a battery, though since his subaltern days he has had no practice. There is a world of truth in the old tag "the captain knows nothing and does nothing."

And is not the G.P.O. also in rather an unfortunate position? H- has no section to command and although he has certain definite duties when the battery is going into action, duties which require considerable exercise of initiative, he is for the greater part of the time while in action very little more than a post office. In fact a battery in action is full of post offices. The chain of communication from B.C. to gun is just a long pipe:—B.C.—telephonist—telephonist—G.P.O. (General Post Office!)—section commander (also

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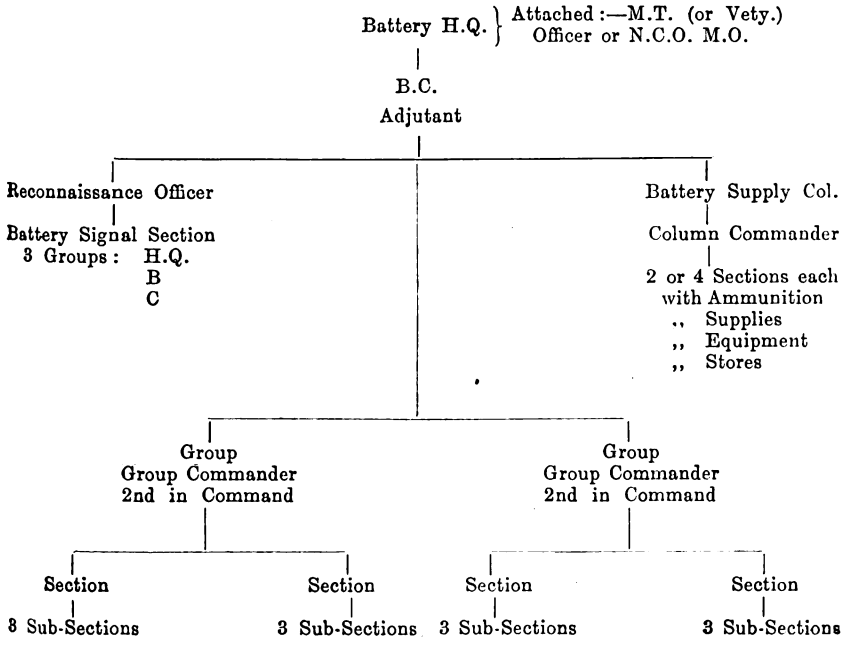
a P.O.)—No. 1. It seems such a waste of valuable material to have three officers in a battery all acting as post offices!

It is claimed for the following suggested organisation that it solves many of the problems of the moment. While pointing out its merits we will leave the critical (and probably scandalised!) reader to discuss its demerits, if there are any.

We require firstly a self contained fire unit of convenient size. We require a means of controlling two or more such fire units tactically. And we further require a means of administering and supplying those tactical units. It must be possible when circumstances require it, for the fire units to act independently as tactical units. It is essential to have an organisation which will not change according to the situation, and not involve any degree of improvisation to meet certain tactical conditions. Finally, any proposed change must show, in these days, a definite degree of economy, or it will not be considered.

Here is a proposed battery organisation :—



The Battery examined in detail

i. *The Section.* Its commander a subaltern who is normally a fire commander only. To assist him a *Section Sergeant,* whose duties will be the active supervision of work in the gun line. A junior N.C.O. will be required for the clerical work connected with gunnery. The section will consist of three subsections, each of a gun and its ammunition carriers. A sergeant or lance-sergeant will command a subsection, having a junior N.C.O. to take charge of the ammunition

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vehicles. Not less than six trained signallers will be necessary, with pack or other transport for equipment, and at least three signallers must be mounted.

ii. *The Group.* This will be commanded either by a major or senior captain, who would exercise the powers of a company commander. He would require the assistance of a subaltern whose duties would include the organisation and training of the group staff (including section signallers), organisation in battle of the group communications, liaison work with forward infantry elements, and patrolling.

A group sergeant-major (W.O. II) and a Q.M.S. (Staff Sgt.) will be necessary, the duties of the former in battle being to collect and control the movements of section ammunition vehicles and to supervise the immediate supply of ammunition to the gun lines. Eight trained signallers, of whom four must be mounted, would be necessary, and for the rest a proportion of storemen, clerks, bâtmen, cooks, stretcher-bearers, sanitary men and artificers.

The Battery. The B.C. would be a senior major drawing command pay. His staff should consist of an adjutant (junior captain or subaltern) assisted by a B.S.M. (W.O. I); a signal or reconnaissance officer, with ten trained signallers (3 groups). There must be a battery supply column, corresponding to what we now call the "first line," commanded by a junior captain or subaltern, assisted by a B.Q.M.S. (W.O. II) with a technical staff of a M.T. or veterinary specialist, artificers, etc. The column would be divided into two or four sections, each under a sergeant, with a proportion of ammunition vehicles, supply, technical store, clothing and equipment and forage or petrol wagons, lorries or vans.

Merits of the Organisation.

i. *The Section* is of a convenient size to be controlled by one man; it is easily placed in position, and easily concealed; it is self contained and has sufficient signal personnel to enable it to maintain communication with its observer and its ammunition supply; it has considerable fire power, which is *not* unduly weakened by the detachment, when the situation demands, of one gun for anti-tank defence, or the close support of a small infantry unit; its organisation enables it at any time to act tactically with infantry, such as with small advanced or rear guards, or in close support of companies and battalions. Fire control is simple, and may generally be direct from O.P. to No. 1 through the mouths of no more than two telephonists.

ii. *The Group* is a very convenient formation, both from a tactical and an administrative point of view. The addition of a subaltern and a strong signal group will enable the commander to remain in close touch with his two sections, and at the same time maintain continuous liaison with the infantry he is supporting, and to watch the tactical situation. It is an ideal formation for work with advanced or rear guards, as the Commander having no fire control duties, is in the position of a C.R.A

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and can give his entire attention to the tactical situation. When artillery is concentrated for a set piece attack a group can conveniently be fought as a six gun fire unit, the two groups then coming under the immediate tactical control of the Battery Commander. Administratively, the junior major or captain who commands it has a very neat little command similar in strength to an infantry company, and with a responsibility in the way of stores, equipment and transport which is commensurate with his powers as a company commander.

The Battery is a tactical and administrative formation, compact and well balanced. It is of similar strength to a battalion, and its commander, a senior major, should have similar powers. It is tactically of convenient strength to form part of a brigade group in an attack, or when operating with larger protective guards or detachments of the size of a brigade or greater. It is of convenient size for moving as a reinforcing formation when large concentrations of artillery are required. The duties of a battery commander in battle would be very simple, namely: the tactical control of its groups when concentrated, close liaison with infantry formations of the strength of a battalion upwards, and at all times the supply of ammunition, stores and equipment to sections. Touching the question of ammunition supply, the author of the article of which this is a criticism appears to advocate a reversion to the method of supply of infantry ammunition by the D. A. C. or other artillery echelon. He gives no reasons for this. S.A.A. is far more easily supplied to infantry by its own divisional train, the companies of which are generally in closer touch with the brigades they serve than it was by the S.A.A. section of the D.A.C. Indeed, there has recently been much argument in favour of grouping the S.A.A. sections of each train company into one S.A.A. Company of the train. The proposal has much to recommend it from the points of view of freedom of movement and unity of control. This is somewhat of a digression, but is has its bearing on the problem, as the supply of S.A.A. is one of the factors taken into consideration by the said author in working out his divisional artillery.

For our own part we would organise our divisional artillery thus :—

(a) Headquarters.

(b) 2 Brigades :—

1	2 Light Batteries	24 guns	= 72
	1 Pack ,,	12 ,,	
2	2 Light Batteries	24 guns	
	1 Medium ,,	12 ,,	

(c) D.A.C.

Although nothing has yet been said about anti-aircraft guns, it is considered that these are an essential ingredient of a well made Divisional Artillery. In future wars A.A. guns will have to give

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infantry as well as the other arms very close support and it seems preferable to add one battery (12 guns) to the D.A. mixture.

At the proposed D.A.H.Q. organisation we do not cavil, except to suggest that the inclusion of a whole field company of R.E. seems unnecessary. There will never, under normal circumstances, be enough work for them to do. Some R. E., it is agreed, are necessary, and it would seem better to have a special artillery R. E. section attached to the D.A. (a portion with each brigade) to give technical advice, and to supply material for dugouts, gunpits, camouflage, and for the many other requirements of guns. The section need not be large, but it must be large enough to ensure that batteries are not starved of either material or advice.

Brigades are formations, not units, and must be staffed as such. In place of a 2nd in command we want a staff officer for "G" duties. A reconnaissance officer can combine the duties of "I" and "signals," and another staff officer is required for A. and Q. work. We don't like to call him a quartermaster. With the School of Military Administration now in full swing, the supply of trained R.A. men should be ample. It is an open question whether any Brigade Ammunition Column is necessary. There seems to be no reason why the D.A.C. should not in normal circumstances deliver direct to battery supply columns, if it is suitably organised. If at any time the temporary formation of an intermediate echelon becomes necessary, it can always be provided by brigading a portion of the battery vehicles, a procedure which is customary in infantry battalions in similar circumstances.

A comparison of the above scheme with the one it professes to supplant will show at once a distinct economy, not only in officers but in other directions as well. It is claimed that an organisation has been evolved which is balanced, and eliminates as far as possible "the pipe," and should at least satisfy the preachers of economy. "Tactical" control has been definitely distinguished from "Fire" control. It will no doubt be argued against the proposals that too much responsibility has been put in the hands of N.C.O's; for example, in giving sections only one officer who will, in action, be at the O.P. and unable to supervise in the gun line. The alternative is to have the observation of fire performed by N.C.O's, and at present it will no doubt be admitted that the class of N.C.O. we have is not suitable. Trained observers to supplement, or rather take the place of, officers, we must have, and for a long time the writer has thought that the best solution is to attract to the colours, by the inducements of pay and promotion, men of superior education whom we will train specially to observe fire. In the meantime one cannot help making the observation that we do not train our N.C.O's to observe as we should. Observation of fire is a comparatively simple, and to a certain extent a mechanical operation, depending on a good eye and power of quick decision, both of which can be developed by training. Yet the amount of time we devote to this branch of training is negligible, even in the case of officers, and instead of being a daily routine, is

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generally only given attention at, and perhaps just before, practice camps.

The duties of the officer in battle are a continuous study of the tactical situation, the selection and concealment of positions, the closest liaison with the infantry, the maintaining of perfect communication with the leading units in the fight and with the eyes in the air, so as to be ready to translate instantly the decisions of junior infantry tactical commanders into suitable action by the guns. No man can tell when the situation will change and the tide of battle is not going to stand still while Canute in his O.P. finishes his "series." While he is engaged the psychological moment passes, never to return.

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IMPERIAL UNITY.*

"Respice Finem."

A Short Review by CAPTAIN C. H. BRITTAN, M.C., R.A.

Introduction.

THE Meeting of the Imperial Conference in 1921 brought before us, more strikingly than before, perhaps, the importance of all questions which are bound up in the relationship between the self-governing Oversea Dominions and the Mother Country.

Circumstances have been greatly changed by the war, and the problem of Imperial Unity as it was presented before must now be looked upon with clearer perception, and our responsibilities in this important matter realised by us all.

Firstly, we must understand that the responsibility for the direction of affairs in the British Empire does not lie only with the Cabinet Ministers, and Government Officials who administer their policy, but also with the electors of those Cabinet Ministers, those who write for and read our newspapers, and in general all those who think and talk of matters appertaining to our Imperial relations, these last forming, as they do, one of the most dominant factors in government, Public Opinion. A glance at the daily papers will convince one of the situation as regards the latter. Pages are occupied with reports on boxing, racing, cricket, etc., and it is often with difficulty one can find the reports of important Imperial affairs. Sport, valuable as it is in our national life, is after all but of secondary importance when compared with matters concerning the Empire. This is in no way the fault of the Press, who cater for the public. The expression of public feeling and opinion is found in our newspapers, the latter being a very good barometer of the former. The only conclusion that can be drawn is that the general public do not realise the seriousness of the economic position of England.

The rapid growth and extension of the Dominions, which called for changes in Imperial relationship previous to the war, will continue at even greater speed in the future, and the time has now come for us to consider what can be done to ensure that all parts of the British Empire are knit together as closely as possible in the interests of Imperial co-operation.

With this object in view we will examine the salient features which make for the development of our Empire, under the following headings :—

* From the "Royal United Service Journal," August, 1922.

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(*a*) Defence.
(*b*) Political Relations.
(*c*) Commercial Relations.
(*d*) Immigration within the Empire.

In dealing with a subject so vital, yet so complex, as the one under consideration, it cannot be expected more than to touch upon the most important points in the scope of this article. At the same time it is hoped that some assistance may be given to those to whom Imperial affairs have been in the nature of a "closed book" previously and that a fuller realisation of our responsibilities may be achieved.

Defence.

Before we examine the problems under this heading we must have a clear conception of what "Defence" means.

The use of the word "defence" is apt to be misleading because it conveys to the mind the idea of a thing to be defended locally, the safeguarding of a certain area or place. This is a short-sighted view as local defence can never secure our sea communications, upon which the safety of the Empire depends.

It is of little use carrying out a passive defence, and attack, as has been proved in the past, will be found to be the best method of defence, and the force from which the attack is to be expected must be our first objective.

A concentration of our forces making such an attack will be the most effective means of defending each part of the Empire, and separate local defence, in addition to wastage of man power, endangers the security of the whole, and may lead to defeat in detail.

The security of the Empire has always been based on the strength of the Navy. It is not necessary to discuss here the present policy as regard that Service, as it is now generally admitted, and has been markedly emphasised in the late war, that our very existence is dependent upon our sea supremacy.

Being an Island Empire, the co-operation necessary for offensive action by the Army can only be possible, when, and at such time as the Navy has defeated or masked the hostile naval forces.

One of the most salient changes in our Imperial relations, as a result of the war, is the complete annihilation of the German naval forces. With this fact in mind the necessity for the maintenance of our own sea power is apt to be forgotten. Causes which might lead to an outbreak of hostilities always exist, and the possibilities of interference with British policy or trade must not be lost sight of.

In this great matter of Imperial Defence there should be a partnership between all parts of the Empire, a general system of mutual support which is as essential to each part as to the whole.

If the Dominions, then, are to share in this partnership, in which all have a common interest, they should also take their fair share of the burden which security of the Empire entails.

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At present the Dominions, Australia excepted, contribute practically nothing towards the cost of the British Navy. This (and in many cases the Colonies are the first to agree) throws undue taxation on the United Kingdom.

If one may be permitted to formulate a solution to this problem a division of expense on a "per capita" basis suggests itself as a possible one.

Against this, there is a strong feeling in the Dominions that their interests in Imperial Defence should not be limited to an annual subscription, but that they should maintain their own fleet manned by personnel drawn from the Dominion concerned.

The British Government originally opposed local navies on strategic grounds, and the utilization of these forces for local defence only appeared to be unsound. However, a Naval Agreement was made in 1911 with Canada and Australia as a compromise, and the naval services of these Dominions recognised. On the outbreak of war in 1914 these naval forces were placed at the disposal of the Imperial Government in accordance with the terms of the Agreement, and remained under the control of the British Admiralty during the course of the war.

As regards Military Defence, matters have been on a more settled footing since the creation of the Imperial General Staff in 1909. Standardisation of the Military Forces, and an understanding that these could be used for the common defence of the Empire, should the Dominion Governments so decide, were the chief results of the work of that formation.

The harvest of their labours was gathered with great success in the late war, when the Dominions contributed so largely towards the final victory.

In this connection, it should be remembered that a permanent peace organisation is required in each Dominion, not only for local defence, but also for Imperial purposes, and that such an organisation must provide for a mobile force ready to act in any theatre of war. The question of the scale on which such a force should be maintained is one which is intimately connected with the domestic problems of the Dominions concerned. A democratic policy being determined usually by external influences, the danger of efficiency being sacrificed to economy is always existant.

The feeling throughout the Dominions, and one which has grown rapidly during the past few years, as far as can be ascertained, is that self-defence is one of the foundations of self-government. While fully realising the merits of this sentiment, we can do no better than recall to mind the words of General Smuts, written in 1906: "Our strength does not lie in isolation but in union."

Before leaving the question of defence, there is one other point which must be considered, and that is the problem of unity of command.

The following remark, attributed to General Sarrail and said to have been made in September of 1914, brings home to us the importance of the matter. "After all Napoleon was not so great a General—he only had to deal with coalitions."

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It was not until after three and a half years had elapsed that unity of command was attained by the Allies in the late war, when General Foch was installed as General-in-Chief.

We must, therefore, face the question, since it appears to be one which requires early settlement, and the danger of leaving such an important problem unsolved until a crisis of national proportions arises, cannot be over-estimated.

If we consider the possible risks and dangers, to which so large a community as the peoples of our Empire are exposed, it may assist us to realise fully the first-rate importance of our Imperial Defence.

It is not proposed to enumerate here what these dangers may be, for they will suggest themselves to all who strive for a better insight into the furthering of unity, strength and development of our great Empire.

Given the mutual confidence and support which are essential, the wide dispersion of the various parts of the Empire is, in itself, an inestimable factor in the successful solution of the problem of Imperial Defence.

Political Relations.

The problem of the Political Relations between the Mother Country and the Oversea Dominions is one which presents itself most forcibly at this time.

The political status of the Dominions has altered very considerably, as was inevitable after the war, and we must look for some definite results from the resolutions made by the Conference to clear up the present indefinite situation.

Before we continue to examine any further the problems which confront us to-day, it will not be out of place to consider briefly the course of events in our political relations with the Dominions up to the outbreak of the Great War.

In 1897 the first Colonial Conference met with a view to discussing certain Imperial questions, the Prime Ministers of the Dominions participating. No great decision appears to have been arrived at, the general opinion being that Imperial relations were satisfactory.

The Conference of 1907 was marked by signs of distrust against any encroachment upon the national autonomy of the Dominion, and this is one of the salient features of the situation to-day and will be considered later. It was decided at this meeting to hold a Conference every four years, and one of the chief results was the division of the Colonial Office into two branches, one for the Dominions and one for the Crown Colonies.

At the meeting in 1911, the first Imperial Conference, there is evidence of the impatience of the Dominions at the system of connection with the Colonial Office, and at the narrow limits of their autonomy in spite of full recognition so far as local affairs were concerned.

In consequence of the war the meeting for 1915 did not take place, but a great step in advancement was made in 1917 with the

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formation of the Imperial War Cabinet at which representatives of India were present for the first time.

This Conference has importance, not as a result of any new improvements in constitutional relations, for it was agreed to let matters stand in abeyance until the conclusion of the war, but from the expression of opinion as to our political relations.

A detailed study of the Conferences to which reference has been made leads one to the following conclusions :—

(i) That few practical results or material benefits have been achieved by them.

(ii) That the Dominions were unanimous in their desire for a change in the handling of questions of such Imperial moment as the issue of peace and war and the general foreign policy of the Empire.

(iii) That in future some form of Imperial Parliament, dealing only with Imperial questions, would be necessary, based as it should be on the recognition of the Dominions as autonomous nations of the British Commonwealth.

This brief *résumé* of past events leads us up to the situation as it is to-day.

The Dominions as partners of our great Empire naturally want their share of its management, and a marked change in Imperial relations took place with the provisions of the Peace Treaty and the Covenant of the League of Nations, in which the Dominions assumed independent membership. Having thus assumed a status of equality with the United Kingdom, the Dominions must now be prepared to take their share of the responsibilities, the chief of which is to-day, perhaps, our foreign policy.

There also appear to be many minor questions which need to be settled, amongst which one may mention representation of the Dominions at foreign capitals, the system by which the co-operation of the nations of the British Commonwealth will be carried out, and the system under which Governor-Generals are to be chosen. These and many other problems arise as a result of the new political status of the Dominions, the solution of which will be awaited with great interest.

Before leaving this question of political relationship, it is important to realise how essential to the well-being, and even the survival of the Empire, political entity is.

It will require machinery of the highest order to carry out successfully the co-operation of six different Governments, all working in common interests, and several suggestions have been made in the press as to the means.

Loyalty to the Crown is one of the most binding of all our imperial relations and its unifying influence is inestimable, but in spite of it we have ample evidence of separatist tendencies in certain quarters.

The loss of the Dominions would be a great one to the United Kingdom, but the loss of the United Kingdom to the Dominions would leave the latter in a condition highly dangerous to their existence. This is only mentioned because such a danger does exist, though it

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can hardly be conceived that British peoples would actively seek this means of self-destruction.

Commercial Relations.

Trade considerations have from the earliest times formed the basis of our Colonial system, but the necessity for the Dominions to frame their own trade policy was evident and has been a recognised fact for some considerable time.

The fiscal arrangements of the different Dominions differ so much among themselves, and in turn all differ so much from those of the United Kingdom that, though it would appear to be on the verge of impossibility to unite the British Commonwealth commercially in the full sense of the term unity, it should be possible to considerably improve existing relations.

In our Dominions and Colonies which are as yet still young nations, there is no fund of accumulated wealth such as there is in the United Kingdom, upon which they can draw for revenue in the form of income tax; in consequence they depend largely upon their import duties.

As previously mentioned with reference to the subject of Imperial Defence, democratic policies are usually governed by internal influences, the direct consequence of which being that a policy of indirect taxation is more popular than one imposing taxation on the people of the country direct.

It is generally understood that a tariff on imported goods will protect home industries in a country where they are in their infancy. This, it is thought, is one of the chief reasons for the present situation as regards commercial relations within the British Empire.

While the necessity for protection in the Dominions can be understood, it must not be forgotten that trade within the Empire has been considerably hindered by it, and in the past matters were further complicated by commercial treaties made by the United Kingdom which gave preferential treatment to certain foreign nations.

In recent years the United Kingdom has been granted preferential treatment in the matter of imports by all Dominions in varying degrees, but as their autonomy in local matters was recognised also, the question of arrangements with favourable terms to foreign nations is one which has caused considerable discussion, in so far as it affects British preference.

It is neither necessary nor desirable to investigate here the relative merits and failings of Free Trade and Tariff Reform, but it is noted in passing that whilst the United Kingdom has accepted the former, the Dominions are strongly in favour of protection, and at present the champions of Free Trade in the Colonies seem to be making but little progress.

The situation which now requires consideration is how to bind closer the commercial links of our Empire. The new status of the Dominions, as mentioned in connection with our political relations, does not materially affect trade relations, which can be regulated by

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consultations and agreements between the parts of the Empire concerned.

The following methods suggest themselves as ones which would increase our commercial co-operation within the Empire :—

(i) Reduction of the present duties in favour of the United Kingdom.

(ii) Imposition of duties on certain foreign imports now "duty free."

(iii) Increase of duty on all foreign imports, other than those under (ii).

If the political situation admitted it, there seems little doubt that a system of mutual preferences would considerably increase the union of our commercial relations.

One further point deserves notice, that of Empire communications. Although not entirely a commercial question, it is one, in peace time at any rate, that is closely bound up with the trade of the Empire.

A quick and reliable service of communications is essential to commercial prosperity, and the rapid strides made in wireless telegraphy during the late war will probably give us at an early date alternative routes to supplement the cable service.

An Imperial Wireless system will form, in itself, one more link in the chain which binds the nations of the British Commonwealth together.

Immigration within the Empire.

That the future of our Empire depends to a large extent on the numbers and quality of the immigrants to the various Dominions is a fact which will be readily admitted.

It is very satisfactory to note that previous to the war the proportion of emigrants going to the Dominions and British Colonies from the United Kingdom was as high as 87 per cent., and this rate will probably increase in the future, given favourable conditions.

The problem we have to consider, however, is not only one of emigration from the United Kingdom, but one far more complex—that of immigration within the Empire.

In the United Kingdom, the population, within certain limits, is comparatively fixed, so that immigration is relatively a small factor, and the chief matter for concern is the question of emigration.

In the case of the Dominions, however, the immigration problem is a much-debated one, and as yet awaits satisfactory solution.

There are three points which we must bear in mind in considering the subject :—

(i) That the density of population in the Dominions and Colonies varies considerably, and is, in turn, very small, when compared with that of the United Kingdom.

(ii) That even under the most favourable circumstances the Dominions can only find work for, and absorb, a certain number of immigrants.

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(iii) That the Empire consisting as it does of peoples of all races and creeds, the colour question is bound to arise and has great importance in the immigration problem.

The effects of the war on this question of immigration are not quite clear; but it seems probable that the chief one will be increased emigration from the United Kingdom in consequence of the industrial situation and the unsettled state of domestic affairs generally.

The Dominions as self-governing nations must have the right to settle the problem themselves, but it is one which cannot be considered in compartments affecting as it does the Empire as a whole, so that co-operation in its highest sense will be necessary.

Immigration has such a wide bearing in the commercial world, particularly in the labour market, that, although it is for each part of the Empire a domestic question, it is also very much an Imperial one. Each Dominion must consider her needs in this matter and decide upon a future policy in close consultation with the Mother Country and the other Dominions.

The idea of a "Common Citizenship" of the Empire, as suggested by some, merits attention, but appears to be inconsistent with present-day feelings, more especially when the dangers of the "Yellow Peril" in the East and the large black majority in South Africa and our Western Colonies are realised.

The relative merits of a policy of exclusion and of "the open door" are ones which will probably be considered in the near future together with such questions as the allocation of land to immigrants and State grants and subsidies. It is now generally recognised that in order to get the most desirable type of immigrant with the necessary qualities which make for rapid development there must be some form of selection; what form this selection will take in the future we cannot here attempt to anticipate, but that some policy of exclusion will be adopted seemed doubtful in view of the present feelings in the Dominions on the subject.

The personnel which composed the Imperial Conference of 1921 alone guaranteed success, and gave the impression of the reality and worth of the meeting.

Of the actual proceedings we know very little, as the Press in the United Kingdom appeared to evince but small interest in a matter of such Imperial moment; this point has, however, already been touched on in the introduction to this paper, so that no more need be said.

A summary of the proceedings and conclusions has been published and from this document we can review in general terms the work of the Conference.

The most important question, and one that came in for detailed consideration, was regarding the Foreign Policy of the British Empire. To quote the official report:—

> "It was unanimously felt that the policy of the British Empire could not be adequately representative of democratic opinion throughout its peoples unless representatives of the Dominions and of India were frequently associated with those of the United

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Kingdom in considering and determining the course to be pursued."

Questions under the following heads were discussed :—

(i) The situation in Upper Silesia.
(ii) The Anglo-Japanese agreement, the problems of the Western Pacific and the Far East.
(iii) British policy in Egypt.
(iv) The Constitutional relations of the component parts of the Empire.
(v) Imperial Defence.
(vi) The League of Nations.
(vii) Imperial Communications.
(viii) Shipping.

In addition to the above, special committees sat to consider :—

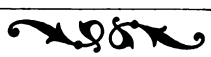
(*a*) European Patents.
(*b*) Nationality of children of British parents born abroad.
(*c*) The position of British Indians in the Empire.
(*d*) The condomium in the New Hebrides.

From the above lists the vast scope of the work of the Conference can easily be understood, and we can realise that the Imperial Conference of 1921 was no mere patriotic demonstration, but a meeting of real workers and thinkers, the Imperial machinery in embryo, for the furtherance along co-operative lines of our great British Commonwealth of Nations.

Conclusion.

This short review will, it is hoped, have given the reader sufficient background to visualise to some extent the present situation in the Imperial affairs of the British Empire.

What will be the general effect of the results of the meetings of the Imperial Conference it would be premature to predict. That the issues they had under consideration were of the greatest importance to our Empire, we cannot doubt, and the future of the great British Commonwealth of Nations lies with them and their successors, in part, as representatives of their Countries, for the sealing of a complete and more harmonious Imperial Union. Finally, let us recall, and keep before us the words of Burke : "A great Empire and little minds go ill together."



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THE YUNNAN PACK-SADDLE.

By CAPTAIN H. L. Ff. DIMMOCK, O.B.E., R.G.A.

IN these days when the minds of all soldiers are turning to pack artillery as the possible answer to some of the tactical problems arising out of the Great War, no apology is needed for discussing at some length matters bearing upon this subject, which must therefore be of interest to all gunners. Before the war, when mountain artillery was a highly specialised and highly localised branch of the Service, such a matter would have been of interest only to the privileged few, but since the authorities have decided that pack artillery affords the best means at our disposal of supplying "close-support artillery," the need for which was often so sorely felt by the infantry in mobile warfare, many technical problems have arisen, which were never anticipated in a weapon designed primarily for use in mountain warfare pure and simple—(not that either adjective is applicable to this arduous form of campaigning!).

One of these problems is the provision of an artillery pack-saddle which will carry any of the eight loads into which the 3·7″ Howitzer is divided. The problem is well-nigh insoluble, because the components of the howitzer are of different and often awkward shapes and the weights vary. This means that the brackets on the saddles must be specially designed for each load, and one at least of the heavier loads—the cradle—is not only heavy but its centre of gravity above the saddle cannot conveniently be lowered. It is by no means put forward that the Yunnanese pack-saddle offers a solution to this problem, but it suggests a possible compromise. The mountain gunner, accustomed to the conditions on the Indian Frontier only, may not see any necessity for a single design of saddle for all loads, and may well resent the intrusion of a tyro in such matters, but those pack-artillerymen who are also in touch with the latest views on the subject of "Infantry Guns" will readily agree that, with the proposed limitations in the number of pack animals, some such saddle is desirable, if not an actual necessity.

It is perhaps opportune at this point to describe the Yunnan pack saddle and afterwards to draw attention to such features as seem to be worthy of consideration for those better fitted to judge their merits. But it cannot be too strongly emphasised that the saddle in its existing form is primitive in the extreme and contains many faults which will be apparent to the most superficial observer, and the experienced eye will probably detect other serious defects.

The diagrams give a fairly good general idea of the contrivance. The frame is made entirely of wood, the underside of which is stuffed to form the pannels. It is fitted front and back with ribs which not only serve to strengthen the saddle, but also form guides for the trestle which rests between them. This trestle is a peculiar feature

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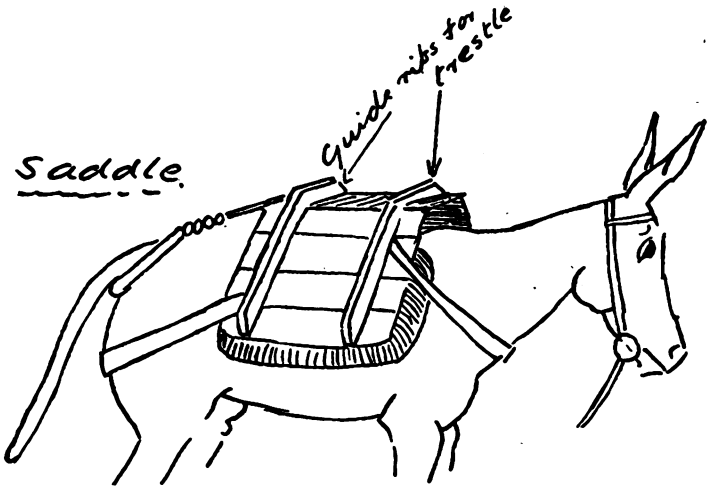
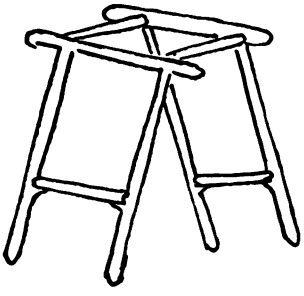
Diagram illustrating the Yunnan Pack-saddle and Trestle.



Trestle.



of the saddle. The first diagram shows the empty saddle, with the breeching, breast-strap and wooden crupper. This breast-strap—it can hardly be called a breast-collar—is a very bad feature, for it presses on the animal's windpipe going uphill. The wooden crupper is also a vile contrivance, and I saw animals with the most dreadful galls at the root of the tail. The rawhide thongs connecting the crupper to the saddle have wooden beads which roll on the animal's croup with the movement of his muscles, perhaps with the idea of preventing chafing, though the crupper itself by no means accomplishes this end. It is devoutly to be hoped that the enthusiastic designer of a universal artillery pack-saddle will not adopt this feature!

Many saddles I saw in Yunnan were very badly stuffed, and padded with straw, but these animals were only used for short journeys

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to and from the railway station, and the Chinese are notoriously casual in such matters. The caravan of 6 mules which I hired, a long-distance outfit, was far better equipped, and I had two excellent mafoos, who constantly looked to their saddles, and rearranged the sheep's-wool stuffing every evening. The second diagram shows the trestle which fits between the front and rear ribs already mentioned. The top of the saddle is flat and the stuffed pannels raise it in the usual way above the mule's back. Thus the trestle can be made an exact fit in the saddle and the top of the trestle rests on the top of the saddle.

When preparing the loads, the trestles are placed on the ground and the loads are lashed to them with rawhide thongs. The balance of the load is tested by lifting the trestle in the middle. I never saw any "top-loads." Indeed it is doubtful if the saddle in its primitive form would take a top-load, seeing that there are no girths. In the railway yards I also saw coolies each carrying two similar loads slung on a bamboo pole, the normal method of porterage all over China. Thus the two main wheel-less forms of transport of the country are used side by side in Yunnan. I have actually seen a coolie carrying a load of 150 bricks up a steep hill in this manner! The Chinese, however, consider that on a normal day's march a coolie will carry 100 lbs. and a mule 200 lbs.

In placing the loaded trestle on the saddle, it is lifted by two men grasping the feet, and is carried over the mule's back from the rear, and some care must be exercised in the process of fitting the loaded trestle between the front and rear ribs on the saddle. This is rather an important matter, for, if the trestle is not properly in place, troubles ensue, the least of which is that the load falls off and the trestle is broken. On the other hand this method of loading from the rear is convenient when dealing with restive animals.

It is usual for the leading animal of the caravan to have a row of jingling bells hanging from the breast-strap, and caravans have only one mafoo to every 3 or 4 animals, who attend to the loads occasionally, and it is surprising how steadily a well-balanced load travels in spite of the absence of girths, and this with the centre of gravity little, if any, below the animal's spine. The loads are always lashed fairly high up on the trestle, as shewn in the third diagram. It is difficult to discover why the saddle has no girths, as these would greatly improve its steadiness, and for artillery work girths are an indispensable necessity. Enquiries from the natives themselves elicit the usual explanation which is calculated to satisfy or at any rate to silence the inquisitive European: "Blong olo custom!"

In spite of its many crudities and disadvantages there is one great advantage of this pack-saddle of which I have had personal experience. One of my mules fell down the "Khud"; the fall was 100 feet or so, during which the animal turned a complete somersault and landed in a bush—a stroke of good fortune. The loaded trestle immediately came off and was picked up further down the hillside. The fact that he was automatically freed of his load enabled the beast to regain his

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footing and the mafoos went down and rescued him unhurt. Not only this, but on looking him over I noticed a deep mark on the woodwork of the saddle, the result of striking a rock. It is probable that any pack-saddle would have proved an equal protection, but the fact that the loaded trestle comes clear in a fall, leaving the animal to recover himself unemcumbered, is a very desirable feature of this peculiar contrivance. On the other hand, the load suffers equally on any saddle in a fall, as a subsequent examination of my kit testified!

To return to the original theme which prompted this article, it is possible that a standard pattern "gun saddle" might be designed. (This should not be confused with the "Universal" pack saddle which is quite unsuitable for conversion.) The trestle-brackets for carrying the various parts of the gun would then be entirely separate, each one for its own load, but one and all designed to fit the standard saddle much in the way that the trestle fits the Yunnan pack-saddle. There is one possible difficulty—weight. The loads of the 3·7″ Howitzer are all on the heavy side, and it seems reasonable to suppose that a saddle and trestle-bracket designed to fit it and to carry a load of some 250 lbs. must be heavier than a saddle of which the steel framework also serves the same function as the separate trestle. On the other hand it may be argued that with such a contrivance we are "no forrarder." Instead of 8 different sorts of saddles we would certainly have 8 of identical design but with them would go eight trestle-brackets all of different shapes.

The Yunnanese are in the habit of piling spare trestles one upon the other on one saddle, and the saddles are dealt with in the same way. Thus in a long caravan it is quite usual to see two of the spare animals loaded in this manner, one carrying 4 trestles and the other with 3 saddles on his back. The reason for carrying spare saddles is that, with the Yunnan saddle in its present form, each saddle must be fitted to one particular animal, and the process of fitting and readjusting the stuffing is a long one.

These points, however, are matters which the experienced pack artilleryman is better able to judge, but with the new scale of pack and draught for divisional pack artillery, and the consequent reduction in the number of animals, the need for interchangeability has already become apparent. If spare trestles can be carried on the limbers now provided, all the animals whether working in draught or in pack would carry the same standard saddle which would conduce towards simplicity. On the other hand it is a well-known fact that some animals will not carry all the loads and the problem is not really as simple as it sounds. For example, if the drivers of the limbers are to ride and drive—and this is the generality of present opinion—they can only have a pack-saddle on the hand-mule, and the ridden animal becomes useless for pack work, unless the new design of saddle is made "rideable." In any case the limbers are temporarily immobilised when these animals are taken for pack work. Nevertheless, a standard pattern gun-saddle would be a great advnatage, if the brains of our designers can compass it without introducing fresh drawbacks.

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MODERN WAR AND MACHINES.

By GENERAL DEBENEY.

Director of the Ecole Superieure de Guerre.

Extracted from the *Field Artillery Journal*, Jan.-Feb., 1923, being a translation of an article appearing in the *Révue de la Semaine*, Feb. 10, 1922, by Captain Paul C. Harper, Field Artillery, American Army.

THE terrible ordeal of the World War convinced all nations that the burden of armaments must be lessened in times of peace. As far as navies are concerned the problem is comparatively simple. In the Navy, in fact, the matériel holds the most important place, and whatever the different types of ship may be, they can be rated by comparison with a common standard in which tonnage, speed, offensive and defensive armament are considered. In a word, it is possible to have some kind of a catalogue or directory in which the allotment of ships of various descriptions is made for all the powers. It is reasonable that international agreements, like those of Washington, should be arrived at, first, to stabilize and then to reduce naval armaments.

On the contrary, the wisest heads have not yet been able to devise a scheme for regulating in any practical way the size of the various armies of the world, so numerous and varied are the factors of the problem to be considered. Thus the defensive value of a frontier depends on its geographic situation, the effectives of peace depend on the length of the period of service, while the effectives of war depend on the size of the population, the budgets for war do not represent all the expenses of war and the matériel suitable for war use is not confined to what is stored in arsenals, during times of peace. In this confusion it is no longer possible to assign a definite value to an army by reference to a common standard and the pictures we used to see of soldiers drawn in different sizes to represent the comparative strength of armies, now represent nothing, especially when these soldiers are drawn in the heroic attitude of the bayonet charge.

After a war of four years it is impossible to wait for this delicate question to solve itself. Also, as soon as peace was signed, the nations started to reduce their terrible burdens, each in its own way, in order to rest their weary shoulders and get a chance to breathe. England and the United States profited by their geographical situation to do

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away with the draft which the pressure of events had forced them to institute. Italy, a continental nation, while continuing obligatory service, reduced the period to eight months. But practical difficulties have prevented her putting this scheme entirely into effect and new laws are now being discussed. Belgium still has conscription but is trying to reduce the period. France also has retained obligatory service, but the length of the period has been reduced, and now only two instead of three classes are kept with the colours. Moreover, we shall not stop there, as plans are being made to cut off another half class, thus reducing the service to eighteen months.

To change from a service of three years to one of eighteen months, which cuts in half our peace-time effectives, is a drastic move toward disarmament, and it is astonishing that it is not generally recognised as such. The effort is especially commendable in that it requires a complete reorganisation of our military institutions. It can be easily seen that an organisation which depends on a peace strength of 600,000 men, for example, can no longer function if the effectives are reduced to 300,000. Everything must be made over. Immediately after the victory this disposition became manifest, and from that moment study and preparations have been undertaken looking to an early general reorganisation of the army.

The question which was, and still is, uppermost in all minds is: along what basic lines should this organization proceed and in what direction should the post-war army be oriented? The unanimous reply is that the organisation of to-day should conform to the experiences of the recent war.

Some of the allies came upon the field of experience gradually and others tardily, but the French Army had the unwelcome privilege of following the evolution of the war in the fulness of its violence from the 2nd of August, 1914, to the 11th of November, 1918. The intensity of their impressions did not relax for a minute and those who fought in our ranks were able to secure a synthetic view of modern war as complete as is possible to obtain at the actual time.

In speaking of a synthetic view, the point is that it is not so much a question of determining the stage of evolution at which we finally won the war, but to follow the various steps and to watch the tendencies which an implacable reality forced on us without any volition on our part. It would be futile to examine purely and simply the results of the war, but it is profitable to base the orientation of the future on the developments that took place during the war.

I shall attempt to take this viewpoint by employing a classification of ideas which appears to me to include the entire subject, and I shall examine what the war has revealed to us regarding the actual importance of matériel, the rôle played by personnel and the relations between matériel and personnel, that is to say, in what manner should the modern army be organised. Thus I hope to be able to assist in the crystallization of the opinions which the great war with its trying experiences has already more or less developed.

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In spite of appearances, most people allow themselves to be influenced more by their observations than by their imaginations. They work easily on what they see, but with difficulty on what they suppose. Also in time of peace, an exaggerated importance is attached to armament. It is therefore upon the tangible element that all the other elements of military power depend. For example, the organisation has for its object only to make use of the armament, and manœuvres serve only to combine the effects of this armament.

In peace time the exact value of an armament cannot be determined. The armament only lends itself to the experience of the drill ground which does not teach much, because the destructive effect, as well as the moral effect, cannot be tested. To complete the experience requires an effort of the imagination which is always uncertain and of which few are capable. Then, if war breaks out, the armament gives its full effects, destructive and bloody, and regains the place of first importance.

It had already gained this place in the nineteenth century, a period of industrial progress, by bringing out with each new conflict some new matériel which had a decisive influence on the result of the operations. The campaign in Italy in 1859 revealed the value of the French 4 cannon. At Sadowa the Prussian Dreyse rifle appeared. Finally, in 1870, the Krupp gun crushed our infantry still armed with the chassepot. That was the progress made in eleven years. It continued, nevertheless, and in the Transvaal *smokeless powder* was first used. Then in the Balkans and in Manchuria we find machine guns and, to a limited extent, heavy artillery appearing on the battlefield.

Then came the great war, and this time it was not a new rifle or a newly perfected field gun that appeared, but a formidable and uninterrupted outpouring of diabolical engines, the nomenclature of which would fill an encyclopædia, the encyclopædia of death. In the last analysis it is the projectile which kills, but all the sciences and all the industries were allied to make the projectile, whether bullet or shell, more and more deadly. The range was increased to distances unheard of before, or the projectile was suspended in the air, a hovering menace, or, on the other hand, it glided noiselessly under the water. The rate of fire was accelerated until it was not so many shots per minute, but so many per second. The capacity of the projectile was increased until it became an infernal machine. Explosives were introduced which were more and more powerful and even gas, asphyxiating, poison and tear-producing. Finally the sciences which seemed to be the most peaceful were employed to locate targets hidden in the best defiladed parts of the terrain. By these sciences the fire was directed and regulated in a way that made it more precise and deadly than ever.

The armament also was no longer composed of simple instruments such as a rifle and a field gun worked by a rifleman or a cannoneer. It was now composed of machines with all their complicated mechanism and with a complete machine shop to assure their service.

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These machines were of two kinds: those which were adapted and those which were invented. This adaptation naturally was applied to the time-honoured weapons of the soldier which up to this day had been considered the only dependable arms. Suddenly the rifle, the old rifle, a revered descendant of the arquebuse and musket, was transformed into the light and heavy machine gun. Instead of ten rounds as a maximum, it now fired an average of four hundred rounds a minute and went as high as five and six hundred rounds with an accuracy unknown to the rifle. We entered the war with 5000 machine guns and at the time of the armistice we had 105,000. The rifle, an individual arm, has largely given way to a collective machine manned by a small group.

It is true that the cannon had made progress since the days when the Bureau brothers supported Joan of Arc's charges at Patay with their bombards. Nevertheless, the epoch is not so far back (1870) when muzzle loaders were still used, which had to be laid after each shot. However, the field gun at the beginning of the war possessed the essential qualities of the modern weapon, breech-loading, rapidity of fire and independent sight. There only remained to perfect the carriage and to make a variety of calibres reaching from the little 37-millimetre infantry gun to the mastodons requiring a locomotive to haul them. Important improvements had already been made, to which others were added, especially in the manufacture of projectiles, but everything considered they were only improvements.

The real transformation of the gun was in the manner in which it was served, or more exactly, in which it was fired. The gun no longer existed as an instrument of fire. It was replaced by the battery. Whether the battery consisted of six, four, three or two pieces made no difference; it was the battery alone which was capable of executing fire. But what a wealth of apparatus, unknown to Gribeauval or Drouot, was at its disposal! Telephones, wireless, signal panels, firing tables, alidade, clinometer, goniometer, theodolite, barometer, hygrometer and so forth, were spread out in the battery while overhead floated balloons and airplanes, and more distant in the observatories telescopes of strange shapes swept the horizon and the queer apparatus for sound-ranging caught the distant detonations. All this arsenal is necessary for the battery in order to determine with mathematical accuracy the emplacements which are farthest away and most carefully concealed, in order to control the point of fall of projectiles, in order to transmit observations and orders and to measure the changes caused by the velocity of the wind or the temperature of the moment. The gun, the old gun, is incorporated in a work-shop surrounded by many machines and is transformed into the main element of a most complex machine.

Then there is the telegraph which we were so proud to have connecting our headquarters. It quickly grew into an infinity of telephone wires which ran as far as the most advanced posts. Telegraphy was even volatilized to make wireless and heliograph communication. The use of the telephone was enormously extended. An idea of this can be

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gained from the fact that in 1917 on one kilometre of front there were a thousand kilometres of telephone wire. These transformations effected in our pre-war matériel were not the only ones but they will suffice to show the most important and characteristic, and we can pass to the domain of inventions and innovations.

First there is the automobile. Of course its employment was foreseen before 1914, but only to a negligible extent; a few touring cars for the staffs and a few light trucks for small supplies. But at the end of a few months the truck was supplementing the railroad in the transport of munitions and heavy matériel and even in some cases supplanted the railroad entirely, as in the case of the endless chain of trucks which ran on the Sacred Road and saved Verdun. The truck became an instrument of strategic manœuvre transporting entire divisions which were thrown into the battle at a critical moment, as in 1918 before Amiens and Chateau Thierry. The figures are particularly eloquent. From a total of 6000 motor vehicles at the beginning of the war the number mounted to 90,000 at the end. Moreover, the motor vehicle was made to enter directly into the fighting by the use of tractors. They dragged heavy guns onto the field of battle itself and, better still, clothed as with a turtle shell they became tanks and crushed without trouble the barbed wire entanglements. They promenaded their machine guns in the middle or even ahead of the assault waves and made victory possible for the British on the Somme as well as for us on the 18th of July, 1918.

In whatever form it may be, truck, tractor, armoured car, or tank, the motor vehicle is only an application of the gas engine. Another application which was developed with startling rapidity was the airplane. The motor found in its power the ability to leave the ground and, supported on wings, floated over the battlefield as an airplane. First used only for reconnaissance, it was perfected to the point where it could make accurate observations for the artillery. This progress was of incalculable importance to our batteries, who now had eyes suspended in the air and could hide themselves so as to have no worries as to their security while they executed their fire through the airplane with which they had wireless communication. Finally, the airplane was armed with machine guns and became an offensive weapon, consecrated by the wonderful prowess of our aces. Gaining more and more power, the airplane began to carry great quantities of explosives to great distances behind the front, and Mainz, Stuttgart, Carlsruhe, London and Paris found themselves under constant menace of bombardment.

At the service of all these machines a new science appeared, whose entry into the line in such a far-reaching manner constituted an innovation of the greatest importance. Until the last war chemistry had contented itself with providing the powder with which to propel the projectile and to explode it. Of course this rôle was a very important one, and far from abandoning it, the chemists continued during the war to improve the quality of the explosives as well as their power in spite of the difficulties in securing raw materials

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caused by the submarine war. But the real innovation was the introduction of poison gas. Never before has an adversary been encountered on the battlefield as crafty and redoubtable as this. As a rule it is invisible and often cannot be detected by the nose while it is poisoning large sections of the atmosphere. One may hope to pass through a barrage between the exploding shells, but there are no intervals in a gas pocket. At times it even infects the ground and, as with Yperite, remains effective for several days. The combatant does not know whether it will be tear-gas, blistering or poison, so that he should protect not only his respiratory organs, but his eyes, his hands, and even his clothing. The poor poilu with his mask, his gas suit and his mittens is certainly evidence enough that the inventions of science are as murderous as they are unesthetic.

Through the transformation of the old armament and the addition of inventions a new armament has appeared on the field of battle. It consists of an impressive collection of machines, at the same time delicate and powerful, around which the combatants are grouped in small gangs, utilising the most varied resources of all the different sciences. This is a striking phenomena, the development of which has been kept pace with from day to day by a corresponding evolution of tactics on the battlefield. It was reasonable to expect that after the war there would be a stabilization of armament and a halt in military science, at least for a time. After each war it is always thus. But it was written that this war, begun with surprises, should end also with surprises and that to the phenomenon of an entirely new armament, developed in only four years, should be added a second phenomenon even stranger and more unavoidable than the first.

It is now three years since the close of the war and already it is evident that the changes in armament caused by the war are not yet finished. On the contrary, the period of 1918, which we supposed would be the end of development, was only the beginning and the evolution of armament continues in peace time with an astonishing persistence. It is natural that the inventors should continue trying to turn out a machine gun that can fire twice as fast as our good machine guns used in the war and that they should seek to obtain fantastic ranges such as that realized by the too famous Berthas. That is their trade. The impressive thing, however, is what is going on in the industrial world at large and which everyone meets and sees every day. The automobile fought the war tied to the road, but it will soon be liberated from this servitude. The progress made in the development of tractors is such that we shall soon see them employed in circulation across country hauling guns, munitions, supplies and personnel. Farm tractors have become very generally used. Tractor automobiles have succeeded in ascending Mount Revard in the snow. A British review has announced the trials of water-tight cars built to cross rivers.

Aviation has been taken up universally by the commercial world, a step whose importance cannot be exaggerated. Not only has the metal dirigible come back into use, but the airplane has been devel-

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oped up to a point where it can carry twenty-five men, or an equivalent weight, for distances of several hundred kilometres. In a few hours it would be possible to turn these commercial planes into bombers that could carry tons of explosives and drop them on Berlin, London or Paris. But the increased capacity for speed and carrying power is only an improvement in aviation. The real innovation will come when airplanes are made independent of their landing fields. The day when the airplane can alight easily on any ground it will really have conquered the air, and then aviation will take its place beside our land forces and sea forces as our army of the air. It is impossible to say how far off this time is, but the commercial development of aviation will result inevitably in an air army.

As for gas, it should not be considered a weapon of modern warfare. It has been ruled out once more and no one is better pleased than the former combatants. It is to be hoped that this ostracism will be more effective than that of the Hague because the chemical industries capable of manufacturing gas are more flourishing than ever in time of peace. In any small laboratory a new formula can be worked out every day from which tons of poison gas can be made in the dye factories that seem the most harmless.

After all, the most formidable of the forces of nature has as yet contributed very little to war. Electricity is used only for communication in the army. We need not be surprised to find it taking a more direct and active part in the warfare of the future. Already it has been used in places to electrocute attackers crossing barbed-wire entanglements and to explode mines at great distances. It is possible that some inventor may find a way to gather Hertzian waves into a sheaf and send them out at his will.

The entire country is an immense arsenal. Even the peace-time products constitute the armament of war and the greater the peaceful activity is and the faster the progress of industry, the greater is the death-dealing power. The works of life perfect the works of death and the peaceful blacksmith is unconsciously preparing for war. This is the second and more serious phenomenon; the war of machines does not stop when hostilities cease. Peace stopped the war but continues the machines.

(To be continued.)

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"DUNCAN" ESSAY, 1922-23.

Subject to be chosen by competitor, but it must be a serious discussion of some up-to-date question connected with R.H. and R.F.A., or it may be a tactical or technical Field Artillery study based on lessons of the Great War.

THE MODIFICATIONS IN FIELD ARTILLERY EQUIPMENT AND TACTICS RENDERED NECESSARY BY THE INTRODUCTION OF TANKS.

BY LIEUT. J. V. TRUSCOTT, R.G.A.

"BEWARE THE JABBERWOCK, MY SON!"

(Recommended for publication).

GENERAL.

1. *Introduction.*

From the days of Crécy up to a few years ago the problem to be solved by artillery in the field had not altered very much. It had always been to hit a stationary target or one that was moving so slowly that it could be treated as stationary. As, in the course of time, scientific knowledge became greater, refinements were introduced, but the general problem remained the same, and this is very clearly shown by the general similarity in design of field gun carriages as we know them to-day and as they were several hundred years ago.

The last war saw the introduction of two new types of target: the aeroplane and the tank, which during the next few years are going to revolutionize field artillery equipment and tactics. Instead of a stationary target we have now got to engage one which moves so rapidly that time becomes just as important as range and line. Anti-aircraft gunnery is further complicated by the fact that the target has to be located in three dimensions, but while anti-tank defence is mercifully spared this, it has a complication of its own. If the gun fails to destroy the tank in the first few rounds, then the tank will probably destroy the gun.

The question of A.A. defence has lately been attracting a good deal of attention, and that of A.T. defence has been rather neglected, though it is of equal importance. I propose to consider in this essay what will be the best method of tackling the problem and what changes in the present equipment will be required.

2. *The type of tank that will be encountered.*

Outside the Tank Corps itself very little is at present known as to what are the possibilities and limitations of the present tank, and

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still less as to what may be its developments. I will, therefore, give a general idea of what the tank used in the next war will probably be like. As at present this arm is in its infancy and at least three nations are carrying out extensive experiments with it, it would be very rash to try and predict what it will have developed into at any considerable period from now. All that I will attempt then, will be to describe the tank as it will probably appear in two years time. Should a great European war break out before this, the development of the tank will be more rapid.

The tank will be generally similar in design to those used in the last war, except that it will be rather smaller and as far as possible all surfaces will be inclined so as to allow bullets to ricochet off them. Its weight will be eight or nine tons and its maximum speed over good flat ground about 30 miles an hour. The crew will be three or four in number, and the armament one gun something like the present six-pounder but mounted in a turret, and two or three machine guns of the Vickers' type. The maximum range of this armament will be about 2,000 yards, but at ranges over 1,000 yards the accuracy of the shooting will be very poor. The greater part of the armour will be about half an inch thick, but in certain small areas over vital parts it may be one inch thick. This tank will probably be capable of travelling four or five hundred miles on one fill of petrol.

This tank will be able to cross most objects other than trenches specially constructed to stop it and ground covered with large boulders or tree stumps. It will also be capable of passing over any sort of ground other than mud like that encountered at Ypres in 1917, and that is not likely to be met with again. The Americans have already built a tank that will float, and experiments on the same lines have been carried out in this country; but it is very unlikely that the tank described above will be able to do so. Owing to its small size its volume will not be able to support its weight.

There will probably also be a heavier type of tank, but this will not come until rather later.

The question as to how tanks will be used is a very difficult one and has not yet been decided. Probably there will be two main uses for them.

(a) To work in close support of the infantry.
(b) To act independently or in conjunction with cavalry.

When working with infantry the rôle of the tank will be to assist in obtaining superiority of fire and to demoralize the hostile infantry by attacking them in enfilade and rear. Tanks by themselves can neither capture nor hold positions, but require the support of infantry, and it must be remembered that in the next war their moral effect will be nothing like so great as it was in the last. In addition to attacking the hostile infantry some tanks may be detailed to pass right through and help their own infantry forward by engaging the hostile field artillery.

Tanks working independently will endeavour to find the enemy's flank and passing around it, attack his head quarters and communications. When the flank cannot be found they will try to break right through the line, but as this will mean losses it will not be the usual way. These tanks appearing suddenly behind the army and attacking

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troops on the march, supply columns, etc., will cause endless loss and confusion. Should they manage to locate and destroy a headquarters they may cause a disaster to their opponents.

3. *The means of A.T. defence available.*

The various means of A.T. defence which will be available are as follows:—

(a) Aircraft.
(b) Infantry small arm fire and rifle grenades.
(c) A.T. machine guns and light guns.
(d) Field Artillery.
(e) Tanks.
(f) Obstacles.

The first will be used to give warnings of tank concentrations and not actually to attack the tanks.

If only for reasons of morale the infantry must be given some weapon for attacking tanks, for it is unreasonable to expect men to fight an attacking force against which they have no means of defence. The tank helping forward its infantry can be compared to a well-known and venerated leader. His presence leading an attack will be of great help in getting the troops forward, but if he is killed the moral effect on his own troops and the enemy is correspondingly great. Therefore the earlier a tank can be knocked out the better. It is said that a new rifle grenade has been made that will destroy a tank, but whether this will be efficient appears rather doubtful. It will have to depend entirely on the disruptive effect of the explosive, and it is unlikely that this will pierce any armour thicker than a quarter of an inch. In the absence of anything else, Lewis gun fire concentrated on the gun ports of the tank can be used to drive the crew from their guns.

The infantry weapons will be backed up by the fire of heavy calibre machine guns and light guns, but owing to their weight the number of these carried will be small. It should also be remembered that it may take a number of hits from a machine gun to put a tank out of action and the maximum effective range will only be about 100 yards. Any tank getting past these defences will have to be engaged by the field artillery.

Friendly tanks will not always be available where required and will usually be needed for other duties. Artificial obstacles including minefields, can be very useful for defending localities such as bases, but owing to the time required to construct them and the difficulty of doing so, they cannot often be used in the field. Natural obstacles will not always be present and in the right positions.

EQUIPMENT.

1. *Characteristics required for an A.T. gun.*

Even if our own aircraft have control of the air and can carry out reconnaissance flights, it will still be possible for surprise tank attacks to be launched against us. These attacks may either be against a portion of the line or else round a flank and so at communi-

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cations and headquarters. The exact point of an attack can never be foreseen and therefore wherever it starts there will probably not be sufficient A.T. guns on the spot to deal adequately with it. It follows that on an attack taking place, reinforcements of guns will have to be despatched to intercept it, and as the attacking tanks may be moving at about 20 m.p.h. the reinforcing guns will have to be very mobile. As these guns move up they may meet the attacking tanks at any moment and before they expect to. Again, columns on the march, in the future, must expect to be attacked suddenly by a force of tanks operating independently, and the guns of these columns must be prepared to defend them at very short notice. Therefore, all A.T. guns must be able to come into action very rapidly when on the move, since if they cannot do so, they will be overwhelmed before they can open fire.

As even when a gun is in a firing position it can never tell from which direction a tank may approach it, and as it may also have to engage targets in different directions very rapidly one after the other, it must be provided with some means whereby fire can be brought to bear very rapidly at any point of the compass. The only efficient way of doing this will be to use an all round free traverse; the laying being done by means of a shoulder support.

The chief difficulty of firing from a tank is that of picking up targets. When close to infantry firing S.A.A. all flaps, etc., must be kept closed and the only places left for observation are over the sights and through small holes. This difficulty of the tank must be made full use of by the gun, and to do so the gun mounting must be as inconspicuous and small as possible. A well hidden gun should be able to knock out many tanks without ever being seen.

The gun should also be very rapid firing as it may have many targets about it at the same time. Even if there be only one, that one will probably be endeavouring to hit the gun, so that the latter must be able to get hits very quickly.

With a target moving at anything up to 30 m.p.h. there is going to be considerable difficulty in ranging, and to simplify this the trajectory should be as flat as possible.

To help in rapid firing the gun should have an independent line of sight, and should be layed by a layer assisted by a sight setter. It will also be necessary to have the sights made so that lateral deflection to allow for the travel of the target can be set on them.

While a lucky hit from a splinter of an H.E. shell may break the track of a tank or do some other important damage, only direct hits can be relied upon to put tanks out of action. Roughly speaking 18-pr. H.E. shell with fuze 101e is effective against one inch armour plating up to about 2,000 yards if the angle of impact is not greater than 20 degrees. A.P., H.E. shell gives very much better results but both types are liable to detonate on impact and this more than halves their penetrative properties. It would therefore appear, that while for the present it may be possible to use H.E., before very long it will be necessary to use A.P. powder filled shell.

The characteristics required for an A.T. gun can accordingly be summarised as being:

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1. Mobility and quick handling.
2. All round traverse.
3. As inconspicuous as possible.
4. Rapid rate of fire.
5. Flat trajectory at short ranges.
6. Independent line of sight.
7. Weight of shell to be not less than 18-pr. and H.E. shell to be used for the present.

2. *The suitability of the present field carriage.*

Having seen what will be required from our A.T. gun it will now be advisable to consider whether all these qualities can be obtained in a field gun, or whether a special A.T. gun will have to be provided. There is much to be said in favour of modifying the field gun to suit both uses and little or nothing against it. Multiplicity of gun designs enormously complicates the question of supply and manufacture and is therefore to be avoided. Also it is most uneconomical in personnel and materiel having these specialised guns which are only of use for one type of target. An A.T. gun cannot be in action against tanks all the time and when not so engaged should be of use as ordinary field artillery. Every field artillery battery will need protection from tank attack and the most satisfactory way will be to make it self-protecting.

All the characteristics given above except the second, are necessary for a field gun, and we will consider where the present field gun falls short of the ideal A.T. gun.

The present horse drawn 18-pr. was mobile enough for the work for which it was designed, but if it had to move to intercept tanks travelling at anything up to 30 m.p.h. it would be left hopelessly behind. Further the team of horses is terribly vulnerable to machine gun fire.

Headings 3 to 7 are well looked after in the present equipment but where it principally fails is in the question of traverse. All round free traverse is an absolute essential for an A.T. gun and this point alone will make the present gun useless against fast moving tanks. Even with the split trail the traverse is too slow and too limited, and there does not appear to be any satisfactory way of modifying a limbered gun carriage to extend the traverse much further. The only way at all would be to provide four trails; one each point of the compass; and this would be extremely clumsy. It would also give very startling results when the shock of recoil was taken off the two spades that had been dug in, and put on to the other two which had been lifted out by the previous firing.

We are then left with the conclusion that the present carriage is unsuited for engaging fast moving tanks, but that it is most desirable that some carriage should be designed which will allow the gun to be used both for field and A.T. work.

3. *A suggested design.*

All this reasoning leads up to the fact that an A.T. gun will have to be mechanically propelled. Much has been said and written on the pros and cons of mechanical transport for field artillery and

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much will continue to be said and written. There is no need in this essay to go deeply into the matter and all that need be said is that most people seem to be in favour of it.

There are three types of mechanical transport.

1. The gun on the ordinary carriage drawn by a tractor.
2. The gun on the ordinary carriage but carried by a tractor.
3. The gun actually mounted on a tractor.

The first of these would be useless for A.T. work on account of its comparatively poor mobility and short traverse. The second would be mobile enough, but the only way of getting the traverse would be by placing the gun on a turn-table carried on the tractor. Owing to the narrow space between the tracks this would make the gun stand very high and offer a beautiful target. The third method is the only really satisfactory one.

There is a well known type of light car which is fitted with tracks and has lately come into prominence owing to its feat of crossing the Sahara. This car is less than four feet in height and weights a little over 30 cwt. Its horse power is about twelve and it is capable of a speed of 26 m.p.h. over good ground and of climbing a slope of 1 : 2.

This car of course cannot be used as a gun mounting, but it will serve to indicate what can be done in this line. Taking these figures into account it would not appear to be too optimistic to expect a gun carriage of this type to weigh about three tons and to be capable of doing 20 m.p.h. under good conditions. The gun with cradle should not weigh more than another ton giving a total weight of about four tons. The chief difficulty of mechanically drawn vehicles is their inability to cross bridges owing to their weight, but this carriage would be able to cross any bridge in the countries where it would be likely to be employed. It should also be remembered that the bridging trains of the future will be able to carry very heavy weights, since they themselves will be carried on tractors and so can be made stouter. If the worst came to the worst it should be possible to take the gun off its carriage and take it and the carriage over a river by putting them on floats.

The tops of the tracks would be about two feet from the ground so that there would be no difficulty in making the maximum height about five feet, or just a little higher than the present equipment. The gun would require a shield similar to the one used at present, and a traversing gear with a quick release. The sights would be designed so as to give an independent line of sight and to allow range and lateral deflections to be put on by some one other than the layer.

Whilst it should be possible to fire this gun when moving, it could not be made very steady and when at rest it would probably be best to take some of the weight off the tracks by a system of jacks as is done in a very primitive way with A.A. guns on lorry mountings. There would also probably be a tendency for the gun to jump backwards when firing, but this could be stopped by small spades. The long trail and big spade which we have to-day would be unnecessary.

The description of this mounting is only intended to give a general idea of what is wanted, and to indicate what is possible with the

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present engineering knowledge and skill. The best form of this mounting can only be found by experiment.

THE GUNNERY PROBLEM.

The main point to keep in mind when considering anti-tank gunnery is that only direct hits will be effective.

There are three possible ways in which tanks can be engaged.

(1). Barrage fire.
(2). Indirect fire.
(3). Direct fire.

1. *Barrage fire.*

This method is very expensive in ammunition for unless the barrage is dense it will not be effective. There will be occasions, such as a massed tank attack under cover of smoke, however, when all other methods will be useless, and then this method will have to be used. When once an attack has reached our own lines more damage would be done to our own infantry by a barrage than by the attacking tanks themselves. Therefore, it will have to be strictly limited to areas held by the enemy.

2. *Indirect fire.*

Provided that it is practicable, there can be no doubt as to the desirability of using indirect fire against tanks. If only direct fire is used the area that can be defended by one gun is very small. The moral effect also of efficient indirect fire on the tank crews will be exceedingly good, because they have no means of replying to it except by closing with the guns or calling on their own artillery for support, and neither of these is likely to benefit them much. Our own casualties will be reduced considerably if the tanks can be destroyed before they come to close quarters.

When we come to think about how indirect fire is to be carried out we come up against a whole host of difficulties. In the first place extremely good communications are an absolute essential, and they will have to be direct between the O.P. and the individual gun layers and sight setters. With a tank moving at a rate of fifteen yards every second, the present system which entails at least four stages between the B.C. and his layers, would be far too slow. Orders would be hopelessly out of date by the time they took effect. For the same reason it will also be necessary for the communications to be telephonic and at present we are limited to two possible methods:

(a) Field telephones.
(b) Radio-telephones.

There is no need to enlarge on the deficiencies of the field telephone as it is at present; but there should be no difficulty in improving it. With a gun on a tractor mounting, the telephone can be built into the mounting and it will then be possible to increase its weight and improve its performance. The gun layers and sight setters should be provided with head sets.

With the field telephone there is always the danger that the line will be cut, and this can be overcome by the use of radio-telephony.

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Unlike wireless telegraphy the messages are extremely hard to intercept unless the wave length is known, and jamming is practically impossible. There is, therefore, very little likelihood of communications being interrupted during action. Should, however, the wave length be found by hostile receiving sets and messages picked up, it is possible for them to locate the transmitting station. Therefore, it will not be wise to use the instrument if the battery is expecting to remain in one position for long.

The next requirement will be a rangefinder at the O.P. which will also read bearings and angles of sight to the target. This instrument could be easily designed so that corrections observed to be necessary by the B.C. could be applied to it, and corrected figures read off scales and passed to the guns. These figures would have to be corrected again on reaching the guns to allow for horizontal and vertical displacement from the O.P. This might be done by a mechanical instrument mounted on the gun carriage. This instrument would also obviate the calculation of displacement tables for ordinary field artillery work.

It will thus be seen that to use continuous indirect laying against tanks will be difficult and will require some complicated gadgets. The only other way of laying indirectly appears to be to try and "ambush" the target by laying the gun on some point in its probable path and firing so that the tank and shell arrive there at the same time. A certain amount of the inaccuracy in this method can be allowed for by laddering the ranges set on different guns; but it is very doubtful whether it will be very satisfactory against fast moving tanks.

For the present, therefore, indirect fire appears to be of very little use; but nevertheless, the possibility of using it should not be lost sight of and experimental work should be carried out on it.

3. *Direct fire.*

This, at present at any rate, will be the normal method of engaging tanks and with the equipment already described offers very little difficulty. It will be necessary to use a gun layer to lay and fire and a sight setter to set the range and any corrections required to compensate for travel of target. A rangefinder should be kept at the battery position and should be used to take ranges not only to targets but also to prominent points around the position as soon as the battery occupies it. The range to any target can then be judged quickly and accurately with the help of these reference points.

As the target will be moving so very rapidly the rigid system of bracketing will be impossible, and some other method of ranging will have to be employed. Up to 1,000 yards the range is so easily judged and the trajectory so very flat that ranging should be unnecessary. With the help of reference points it should be easy to estimate the range to within 200 yards and an error of this size makes so very little difference to the sights that it will be taken up by the size of the target.

At ranges over 1,000 yards speed will not be quite so important because a tank cannot make effective use of its guns at this range. Under these circumstances it would appear to be best to fire a long

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bracket and then open fire for effect at a range decided upon by observation of the fall of the rounds. In doing so allowances must be made for the direction in which the tank is moving.

TACTICAL HANDLING.

1. *General.*

An important point to be decided before going into the question of the best tactics to be employed is that of the size of the fire unit. It is a well-known maxim that guns should only be used singly when no other arrangement is possible. The reasons are, shortly, that the volume of fire from one gun is small, and results are not obtained quickly enough. There is also the possibility of the gun going out of action owing to some accident. When shooting at a tank these reasons apply even more than they do at other times; for in this case the gun is engaging a target which is going to hit back. Further, owing to the movement of the target, accurate ranging is difficult, so that it is necessary to put down as big a volume of fire as possible, and trust that the dispersion of the rounds will allow for some of its inaccuracy. Therefore, while at times it may be necessary to use single A.T. guns, it will almost invariably be better to use two or more.

The remaining possible units are the section and the battery. In making choice between these two it must be remembered that while volume of fire at a tank is highly desirable, the primary duty of field artillery is to assist the infantry by engaging targets that are causing losses to them. In the last war the danger of a tank attack was not so much the actual destruction done by the tanks, but the fact that by drawing fire on themselves they enabled their own infantry to advance. Only in exceptional circumstances would it therefore appear wise to take the whole battery off its infantry target to repel a tank attack on the battery. We can go further than this and say that the battery will never be used as the fire unit except when using barrage or indirect fire on large masses of tanks, for when shooting at short ranges one or more guns will usually have their fire masked by the others. Also it will be impossible to control more than two guns by voice in all the noise and turmoil of an A.T. action. The section will, therefore, be the normal fire unit.

It has been assumed so far that only one tank is within view of the battery. It will now be necessary to consider what will be the best action to take, on the battery being attacked by two or more tanks. The system to be employed will depend very largely on the general tactical situation at the time of the attack, and no hard and fast rules can be laid down. Usually, when two tanks approach from the same direction, it will be best to engage them one after the other at long range with one section. Should, however, they manage to get to short range, say under 1,000 yards, it will be necessary to split the section and use one gun on each tank. The fire of the second section will probably be masked by the first and at this range the gun should be able to hit during the first three rounds.

When two tanks approach the battery from widely different directions it may be necessary to detail a section to each. Should the

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tactical situation not allow this, they must be taken on by single guns.

When there are more than two tanks the same general rules will apply. Tanks at long ranges will be engaged by sections, fire being opened first on those which are closest to the battery. If the range is short or the tanks very wide apart single guns can be used.

Artillery fire against tanks which have already passed the front line and penetrated into the defensive zone is bound to cause a certain amount of loss to our own troops. While this is to be deplored it is nevertheless unavoidable, and the loss so caused will be nothing compared with that which the tanks would cause if left alone. Guns should, therefore, never withhold their fire on account of the damage they may do to our own troops.

2. *Tactics when on the march.*

In the future, each independent body of troops will be allotted so many tanks in a similar way to that in which artillery and other arms are allotted at present. The correct use of these tanks on the march will be very difficult for the duties required of them will be :—

(a) To reconnoitre beyond the cavalry screen.
(b) To help overcome any resistance holding up the column.
(c) To defend the column against hostile tanks.

The first of these requires a high degree of dispersion while the other two require concentration. The tanks with the main body of troops will probably march near the head of the column and will move in bounds. This massed formation is forced upon them by the likelihood of attacks by hostile tank formations, which owing to their speed can fall upon the column with very little warning. Owing to these sudden attacks and the fact that the numbers of our own tanks may be reduced by detaching reconnoitring sections, field artillery on the march must always be ready to co-operate in the defence of the column.

Even when all transport is mounted on tracks, columns on the march will still tend to follow the roads and bottoms of valleys, and these will not give good fields of fire for the guns. Also, fire action on the move cannot be so accurate or so well under control as that from rest, so that on an attack taking place the guns will have to halt in order to beat it off. If they are marching in the column these sudden halts will cause considerable confusion and it will therefore be better for the guns to occupy positions to the flanks of the line of march, and move from one to the other in bounds. Arrangements will have to be made for sections of a battery to leapfrog through each other, so that at all times there will be a portion of the artillery ready for action. The positions will have to be chosen so that they are well to the front of the column when first occupied. The present objections to pushing guns too near to the head of a column will not have the same force with tractor guns which are not tied to the roads and have less to fear from small arm fire, than the present horse drawn equipment. Should they get into a tight corner they will have less difficulty in extricating themselves and will usually have the tanks to give them assistance.

When a column is fighting a rear guard action the last troops to be left on a position will probably be the tanks and guns. As

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soon as the other troops are clear the guns will move quickly to the rear and take up positions so that they can cover the withdrawal of the tanks with their fire. Smoke shell put down on the hostile tanks and batteries should be very useful for this purpose. The principal danger when a force is retreating will be that bodies of hostile tanks may outflank the rear guard and cut it off from its main body. To help stop this, part of the artillery with the main body will have to occupy positions to its flanks and rear and move back in bounds.

So far all that has been considered is the use of guns with a column of all arms; but as was pointed out earlier, there may be independent bodies of tanks operating at a distance from their own troops. These will require field artillery to support them in the same way as the independent cavalry is supported by horse artillery. Independent bodies of tanks will probably move in bounds from one position to another after the way has been reconnoitred by scouting sections of tanks, and their artillery will have to conform with these movements. On meeting hostile tanks the duty of the guns will be to engage the enemy from a flank and weaken him and throw him into confusion so that our own tanks can finally destroy him. Whenever possible it will be the aim of our own tanks to draw the enemy under the fire of the guns. When attacking hostile columns of all arms the artillery will probably engage the hostile guns and assist to destroy the enemy's tanks, while a few of our own play havoc with his infantry and transport. When accompanying a tank column in this way the guns may also be used to attack aerodromes, bridges, etc., by long range fire when these cannot be reached by tanks owing to their defences. Long range fire against defiles will be especially useful when an independent body of tanks and guns is endeavouring to delay the retreat of a defeated enemy so that our own main forces can force him to turn and fight.

3. *Tactics when at rest.*

On the occasions during the last war when tanks were able to knock out artillery it was usually because either the exact position of the guns was known to the tank, so enabling it to manœuvre so as to take them from a flank, or else the artillery was heavy artillery and so was not able to bring the guns to bear on the target sufficiently quickly. With a field battery fighting in its present formation the weak point is undoubtedly the flank, since the fire of most of the guns is masked, and any rounds fired by the tank which are not quite the right range for one gun will probably hit one of the others. To obviate this and also the fact that a field battery with the guns evenly spaced in line is very easily seen, it will be necessary to space the guns unevenly and to have both the flanks well thrown back. As the section will be the normal fire unit for A.T. work, the guns of a section should always be sited so that they can both be controlled by voice by the section commander. The battery command post should be placed near the centre of the battery so that sections or guns can be allotted quickly to tank targets.

This irregular siting of guns will make the calculation of displacement tables very complicated, and with the present means will make the process of coming into action very slow. This difficulty

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could, however, be easily overcome by the use of the instrument on the gun carriage that has already been suggested for use with indirect fire. One gun could be treated as the pivot gun and each of the others could set the angles and distance to the pivot gun on its instrument, and on fire orders being received, could read its corrected range and angle to the target. This instrument would be purely mechanical and as simple to work as a fuze indicator.

The battery positions will have to be chosen so as to get as good a field of fire as possible all around, and to make good use of cover from observation. They will need to be placed well back from crests as otherwise hostile tanks will be able to creep up under cover close to the battery and then suddenly rush it. In the past, owing to their very slow speed in low gear, tanks just crawling over a crest have been very easy targets, but they will become more difficult as their speed increases. There are bound to be times when no battery position can be found where all approaches can be covered, and it will then be necessary to detach guns from the battery on a tank attack taking place. With tractor guns this should be easy to do, but should be avoided whenever possible.

A tank attack will usually be supported by artillery firing smoke shell at all known battery and A.T. gun positions. This smoke will not only enable the tanks to approach under cover but will also serve to point out to them the battery positions. It is therefore possible that it may be sometimes advisable to move the whole battery to a new position as soon as a tank attack starts.

Since the guns have got to be capable of all round fire the question of where to put the ammunition tractor in action becomes difficult. The tractor gun will probably carry a few rounds itself but owing to the weight the number will be strictly limited. The ammunition tractor will, therefore, have to be fairly close to the gun, but as the gun has got to be built as low as possible, there will be no chance of it firing over the top of the ammunition tractor. In most cases it will be possible to put the tractor a little way off from the gun in a hollow where it will not obstruct the field of fire, and sufficient ammunition can be dumped at the gun. The ammunition itself might be packed in boxes holding about six rounds and so made that they would fit into a framework on the tractor and could be easily carried by two men. If these boxes were constructed so that their ends were removable, the rounds could be taken out when wanted just as easily as with the limbered wagon.

4. *Tactics of artillery advancing to repel a tank attack.*

The other conditions under which artillery might find itself would be when a large tank attack was beginning on a certain sector of the line and the guns were being rushed up either to reinforce the defence, or if the attack had already broken through, to form a new temporary line of defence. This movement of the artillery might be supported by tanks and, if so, the procedure would be very similar to that used when working with independent tanks. If the attack had already broken through, the urgency of the situation would not allow much reconnaissance by scouting tank sections and the movement of the force would be continuous instead of in bounds.

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If the artillery has to go forward without the support of tanks the very greatest care will have to be taken not to run into the enemy suddenly at very close range, for while a gun at rest will come off best when fighting a tank, if they are both on the move and at close range the position will probably be reversed. Most likely the best solution will be for the guns to move forward in sections with one section to the rear and flank of the other, so that they can support one another. An ammunition tractor or light tractor should also be sent on in front to give warning of the approach of tanks.

It is possible that a tank attack after breaking through the line will disperse into small units and attack various parts of the back area such as bridges, roads, headquarters, etc. In this case it may be necessary to split up the reinforcing artillery and allot different defensive positions to different guns. While the use of single guns is not usually advisable, still, under these circumstances it may not be possible to protect the whole area with the artillery available in any other way.

5. *A.T. defence with the present equipment.*

As has already been pointed out the chief disabilities suffered by the present carriages are insufficient mobility and difficulty of traverse. The first of these renders it impossible for guns to work with an independent body of tanks or to move in bounds when with a column on the march, because, when moving, the gun must keep to a road already crowded with other troops and the continual hurrying from rear to front to occupy a new position would be very trying to the teams. The defence of the column must therefore, be left entirely to tanks and until the fast tank is developed this defence should be sufficient. Again, owing to this want of mobility it will be impossible to reinforce parts of the line which are being heavily attacked by tanks, and the only solution appears to be to detail a few guns to protect important points. Anti-aircraft guns might be used for this purpose, but this should not be allowed to interfere with their proper work.

As regards defence in the battery position, the only thing to do seems to be to have the flank guns thrown well back and to manhandle the wagons clear from all the guns on the first indication of a tank attack. With the split trail carriage, single guns should be able to engage slow moving tanks, while it will require two guns on the other carriages working together so that their trails are moved alternately. When the fast tank comes, it is extremely doubtful whether guns on either type of carriage will be able to engage it with much chance of success.

Conclusion.

The above is a very short and sketchy treatment of a complicated subject; but it is hoped that it will serve a useful purpose. As is the case whenever a new arm is introduced, it has been predicted by some people that tanks will render all other arms of minor importance. We have been told that land wars of the future will be fought

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by fleets of tanks working from bases hundreds of miles apart, and that the only use of the present armies will be to defend these bases. There are very few who will not admit that tanks are going to have a very great influence on tactics in the future; but at the same time, like other arms their principal duty will be to help the infantry. Like every new arm, antidotes will be found which will considerably limit their sphere of utility and the principal one of these will be the tractor gun.

Provided that its equipment and tactics are developed on the right lines, field artillery will have nothing to fear from tanks. In fact the shoe is on the other foot.

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THE LIFE OF LIEUT.-GENERAL SIR JAMES M. GRIERSON, K.C.B.

BY D. S. MACDIARMID, LL.B.

(Constable & Co. Ltd., London.)
1923.

Reviewed by Lt.-Col. Lewis Butler (late K.R.R.).

IT is strange to find how little is known in civil life of the army and of its most distinguished soldiers. Although a household word to military men in general, and to his comrades of the Royal Artillery in particular, it will probably be found on enquiry that hardly one person in four unconnected with the army has any recollection of the name of Grierson or his career. Yet that career was one of unclouded and unchequered brilliancy and fraught with eminent service to the Empire. In another profession he would have been recognised as one of the great men of the day; but the truth is that to "the man in the street" military life with its innumerable issues and side issues is a sealed book. Personal courage is regarded as almost the sole test of capacity, and the award of a Victoria Cross as the undeniable qualification for high command.

In the army itself the view taken is very different. The attainment of high command is the ultimate ambition of every good soldier, but he realises the fact that the path thereto is beset with thorns and that the essentials of success are to be found, not in headlong bravery, but in study of human nature and self discipline, accompanied by the acquisition of professional knowledge in all departments; a knowledge unattainable in its entirety without unremitting thought and reading. "He who aspires to lead soldiers in war" observes Lord Wolseley "should be not only a thorough master of the soldier's science, but must possess a healthy strength of body, an iron nerve, calm determination, and be instinct with that electric power which causes men to follow the leader who possesses it, as readily, as surely, as iron filings do the magnet." By Sir James Grierson all these axioms were grasped and digested at an early age and something more in addition, for he recognised the great advantage of acquiring modern languages and of personal contact with continental armies, and thereby gained a far wider purview of the military profession and art than by service exclusively at home or within the limits of the Empire.

II.

James Moncrieff Grierson, son of a Glasgow merchant, was born on January 27th 1859—which was also the birthday of the late Kaiser—and when only six and a half years old was sent as a day scholar to the Glasgow Academy hard by his home. Here he remained for nine years. We are told that among his companions in the 4th Latin class was Archibald Hunter, and since Sir Archibald was

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nearly three years older than Grierson we are left to conclude either that he was a singularly backward boy or his comrade a singularly forward one. Even in those early days the latter was distinguished in his study of modern languages and history—particularly military history, and loved soldiers and everything connected with them. The boy was unquestionably precocious, but unlike the majority of precocious youths neither became a prig nor lost his ability in early manhood. He was only eleven years old when the Franco-German war broke out yet we are told that "he followed the progress of the Germans as told by the war correspondents, with breathless interest." In England at all events, and probably on the continent to a lesser extent everyone went mad over the German army and its Generals. After the French victory over Austria, in 1859, everything French had been idolised and in the same unreflecting spirit, Germany was substituted for France. Everything now had to be of German pattern, but the mania was confined to comparative trifles such as caps or shoulder straps, for the British public was far from appreciating the thoroughness of the Germans and the meticulously business-like care which in the hands of their excellent general staff were the secret of their success. Still less did it realise that there were weak points in the German armour which might ultimately lead to disaster. Prior to the war of 1870, Prince Frederic Charles had observed that if the Germans took the best points of the French system and incorporated them in their own, they would inevitably defeat France. In 1870, a British army did not exist, but a few years later the Prince's aphorism might have been applied to home use in England; for despite all their care and all their study there were certain essentials to military success appreciated in Britain but ignored in Germany.

Young Grierson's predeliction for soldiers was not encouraged by his parents, but he got his own way, and after expeditions to France and Germany in 1874—spent mostly on battlefields—he passed the examination and in March 1876, entered the R.M.A., whence two years later he passed out fourth on the list with prizes for military history and Italian, and—having selected the R.A. in preference to the R.E.—was awarded the Tombs scholarship for the best qualified cadet entering the Artillery. During his time at the 'Shop,' he had taken up Russian and passed an examination in that language. He truly had the gift of tongues but his cultivation of that gift is not the less creditable to his assiduity; which led also to six months ante-date of his commission.

On joining his battery at Woolwich, Grierson had little or no means beyond his pay, but young as he was he had already embarked not without success in journalism and the renumeration for his articles proved an appreciable asset to his income. The early days of 1881, found him in Central India with his battery; but before leaving England, time had been found for a visit to the Balkans, at that time as at the present, the political volcano of Europe. In India he continued his literary efforts and it was in part due to them that in the spring of 1882, he became attached to the Intelligence Branch of the Q.M.G's department at Simla, wherein his duties led him to the compilation of a work described by the head of the intelligence depart-

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ment as 'the best book we have on Egypt' which country was at the moment the centre of political unrest, and the result was that in August he sailed thereto, in the capacity of D.A.Q.M.G. (Intelligence) to the Indian contingent commanded by Sir Herbert Macpherson and ordered to reinforce the two divisions under Sir Garnet Wolseley, which had already landed at Suez. Grierson was a capacious diary-writer, and his diary was calculated to include not only sufficient information for his immediate purpose, but also 'matter' for the Intelligence Department at Simla and for the Indian 'Pioneer' newspaper. He was present in a variety of reconnaissances and trifling affairs and gives a vivid impression of the fight at Kassassin on the 9th September—"Sir Garnet came on the field at noon and accompanied us to the front. The very sight of the man inspired confidence in everybody. I am sure no troops could have been steadier than ours were, or better in hand. They fired coolly and slowly and advanced with no shouting or excitement but with that dogged 'forward' for which the British soldier is famous. They may say what they like but give me Sir Garnet and young soldiers . . . . The R. A. were splendid and I never was prouder of my Regiment than when I saw the batteries with shells dropping thick into them, firing away and making excellent practice too. 'Shrapnel shell, time fuze, nine-tenths, load!' came as on Woolwich Common and at 'front limber up!' up came the limbers with the usual crack over the trail. There are no troops in the world like them."

At the decisive fight of Tel-el-Kebir four days later, of which Grierson gives another thrilling account too long unfortunately for quotation, he had a narrow escape; a shell at the very outset bursting within two yards of him. After the action the Indian contingent pressed on to Zagazig "26 miles of march with a battle in the middle of it." Grierson's report on the day's work was so good that it was forwarded to the Duke of Cambridge. The war was now at an end and Grierson returned to Simla a marked man, for he had been mentioned in Sir Garnet's despatch. His stay in India was however brief, for within a year he passed the examination for the Staff College, and not only passed but was first on the list although still well under 25 years of age, possibly the youngest man who ever entered the College.

The Staff College at this period was from the instructional point of view immeasurably behind the standard which it has of late years attained, but its strong point was the 'education of association' attained by the bringing together of officers of different corps and different arms of the service, who although for the most part strangers to each other at the outset, soon mingled in the utmost intimacy and with all the camaraderie to be found in a good regiment. Grierson's reputation had preceded him, for his abilities and knowledge of foreign armies were widely known. It was generally rumoured that he had Russian blood in him, and although the rumour appears to have been groundless his appearance gave a certain colour thereto. His features were not handsome, nor was his stout and rather short figure graceful, but his expression was attractive and happy and he quickly became one of the most popular men in the college, while everyone was

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astounded at his marvellous acquaintance with the detail of foreign armies and with their officers, several of whom paid him visits at Camberley. One of them naïvely remarked that before dinner none of the officers could speak anything but English, but after midnight everyone could speak German.

In February 1885, Grierson's S.C. course was interrupted by an appointment to the Q.M.G's Staff of the force at Suakin which was employed in the construction of a railway to Berber. The experience was useful but such operations as took place were mis-managed. At the end of two months the force was withdrawn, and returning to Camberley he passed out at the end of the year with Honours and other distinctions. It was therefore not a matter for wonder that pending return to his battery in India, Col. Brackenbury, head of the Intelligence at the War Office, offered him temporary employment. On returning to India in January 1887, as a captain, he occupied a succession of appointments on the Staff, but "out of hours" compiled a work on the Armed Strength of Germany which was the subject of high compliment, and the more creditable that its author was far away from records and depended on his own memory and notes.[1] To suppose, however, that Grierson's absorption in work precluded him from amusement could be erroneous; and though not much attracted by games, he joined in evening parties, distinguished himself in theatricals, sang and was considered an adept in step-dancing.

After a snatch of active service on the Black Mountain, Captain Grierson came home on leave in the early months of 1889, and was promptly offered more employment by General Brackenbury—with whom his relations had always been most cordial. The invitation was gladly accepted and Grierson found himself again within the rooms of the Intelligence Department and occupied in keeping an eye on the movements of Russia in Central Asia. With Germany at this period our relations were friendly, and his duties took Grierson frequently to Berlin, where he got on so well that a German officer in high position remarked "Grierson, that excellent comrade, is known almost as well at Berlin as at Woolwich; and the whole General Staff of our army knows him and highly appreciates his thorough knowledge of all Germany."

"Carpe diem" must have been his motto, and Napoleon himself could hardly have exceeded Grierson in the power of utilising every moment of his time, while apart from the business of his office the pen was never out of his hand. The last of his works is too long to recapitulate, but among others his "Staff Duties in the Field," earned the warm commendation of Lord Wolseley who expressed a hope that it might be read and studied by every professional soldier. Time was also found for lectures to Military Societies. Thus rapidly passed the days, until in December 1895, he was promoted to the rank of Major followed immediately afterwards by the Brevet of Lieutenant-Colonel 'in recognition of his service in the Egyptian, Indian and Hazara expeditions.' In the same month he was appointed Military Attaché at Berlin, for which position Redvers Buller had said 'he was far the best man.'

[1] While in England two years previously Grierson had written a book on the Armed strength of Russia.

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III.

As already remarked the relations of Germany towards Great Britain at this period seemed to be of a friendly nature, but between the date of Colonel Grierson's appointment and his arrival at Berlin a black cloud appeared. During the last days of 1895 had occurred the notorious 'Jameson Raid,' and on January 3rd 1896, the Kaiser had despatched his no less notorious telegram to President Kruger; and thereby set on fire the temper of the English people already sore at the fiasco and the realisation that their countrymen had been in the wrong. Any idea of friendship between Britain and Imperial Germany was thenceforth at an end. But at this moment of crisis the selection of Grierson as Attaché was doubly and trebly valuable. He was a *persona grata* not only as we have seen with the military authorities but equally with the Kaiser himself by whom his reception was particularly cordial. With the German soldiers he was as ever 'le bon camarade' but while throwing himself whole heartedly into their customs and amusements he kept his weather eye open, and his bonhomie while disarming suspicion concealed a very considerable talent for diplomacy; concealed also feelings of distrust. At the manœuvres he was treated with marked distinction and—rather to our surprise at the present day—found a higher estimate of the capacity of the Kaiser for commanding troops, especially cavalry, than is usually accorded to that monarch. But notwithstanding tokens of friendship which were probably not wholly unreal, Grierson discerned the coming danger, and in a private letter to a friend in the Intelligence Department at home went so far as to say "*We must go for the Germans and that right soon* or they will go for us later." It is difficult to believe that a British Government would undertake a 'preventive' war under any circumstances, and how often in history has it turned out that the object of such a war has of itself ultimately disappeared; but putting aside such consideration would our chances of success at that time have been greater than in 1914? True, in 1897 Germany had no navy, but was our own in a position to exact victory unaided? Our army under the guidance of Lord Wolseley now C.-in-C., was much improved and might have been commanded by him in the field, but neither in strength nor efficiency was it on a par with the future B.E.F., and the Territorial Force was not as yet in existence.

In 1899, Colonel Grierson was present at the Austrian manœuvres which 'did not make a good impression' and afterwards at the German Imperial from which he remarked, however, that nothing was to be learnt. In fact he considered that the art of tactical handling of troops was being lost and that the mass formations in attack would lead only to destruction. His forecast was amply realised during the late war.

In 1899, the South African war broke out and in the following January, Grierson, to his great satisfaction quitted Berlin on appointment to the Staff of Lord Roberts, which he joined on the day of Cronje's surrender at Paardeberg. He was ordered to undertake the duties of Q.M.G., and executed them to the satisfaction of the Chief. Staff duties in general seem to have been performed (or not performed) in the most delightfully happy-go-lucky way at G.H.Q.

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"Orders were at times issued by the C.-in-C. without the knowledge of Lord Kitchener, the Chief of the Staff. Sometimes the officer technically responsible for their execution was kept in ignorance." Then too "Bobs and his people live in the next house to ours, and we call it the 'House of Lords' as they are swarming all over the place either as A.-D.-C's or as simple onlookers and loafers." To a great extent the war in the Orange Free State was being conducted as if it were a huge picnic: a scandal that paved the way for the many "regretable incidents" which occurred, and for instances of lack of discipline and gross lack of co-ordination among officers in responsible commands.

From this scene of disorder Colonel Grierson was suddenly called away in the middle of August, by the intimation of his appointment as Staff Officer to Count Waldersee, C.-in-C. of the Allied Forces assembled in China for the suppression of the Boxer rebellion. He sailed forthwith and was cordially received by Waldersee, but his faith in German foresight and capacity for business was rudely shaken on coming in contact with their troops. "Transports had been overcrowded, food was indifferent, means of landing totally neglected, camp kit non-existent." "But" he writes with pardonable pride "it is a great eye opener for these Germans to come into port after port in each of which the Union Jack is flying the whole way along their journey. It gives them some idea of what the British Empire is." It must however be owned that the Germans are not alone in needing an 'eye opener' of this kind. If a visit to, say one tenth of our Empire, were an essential preliminary to candidature for Parliament, there would be fewer little Englanders, fewer faddists, and much broader views prevalent in our House of Commons!

On arrival in China the Boxer rebellion was over, but the Germans fired off their rifles with or without the presence of a Boxer. "Villages are shelled, stormed"—save the word!—"and then fined on the most slender grounds." Grierson's talents for diplomacy were in constant requisition, as for the allies for the most part were almost at daggers drawn with each other: a state of affairs pretty nearly inevitable in a concourse containing English, French, German, American and Japanese. In May 1901, these ignominious operations came to an end and Grierson came home by way of Japan. For a very few weeks he resumed his post at Berlin, but in the autumn was appointed to the Staff of the 2nd Army Corps at Salisbury, commanded by Sir Evelyn Wood, and for the next two years enjoyed what for him was a comparatively quiet and uneventful life!

IV.

From this he was suddenly aroused by the re-organisation of the War Office. Upon the recommendation of the "Esher Committee" the office of C.-in-C. was abolished—Lord Roberts being unceremoniously dismissed—and that of Chief of the General Staff substituted. It was a Lytteltonian epoch, and an officer of that family was naturally selected to be the first C.G.S. Under him were three Directorates, viz., those of Military Operations, Staff Duties and Military Training. Grierson had been selected as Director of Military Operations, with the rank of Major-General and pay of £1,500 a year. His early promotion had been slow, but to receive General Officer's

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rank in not much more than eight years after he had been a Captain, made up for lost time, and his age was only 45. It was in February, 1904, that he began his new duties for which he was pre-eminently qualified, and which included supervision of his old branch of work, the Intelligence Department.

In October he sailed for Gibraltar to examine its defences, and on arrival heard of 'the Dogger Bank' incident which for the moment threatened war with Russia. It will be remembered that a Russian fleet starting for the Far East in the war with Japan, mistook some British trawlers in the North Sea for Japanese torpedo boats. It was, however, obvious that in firing upon these fishing boats the Russians were impelled by an attack of nerves rather than by malice; cool heads and wise counsels prevailed and the storm cloud soon passed away. But another soon arose, and although on his frequent interviews with the Kaiser the latter was always friendly, General Grierson had long made up his mind that war between Britain and Germany was merely a matter of time. Early in 1906, the Prussian bully came to the fore and an attack on France seemed close at hand. A happy result of this state of affairs was that conversations began between the General and Colonel Huguet, French military attaché, on the subject of co-operation between France and England in the event of war, and schemes for mutual support were outlined even in detail. For the time being war was averted but the plans made were carefully kept ready for use.

In September of this year (1906), Grierson was present at the Belgian manœuvres and formed a poor opinion of the efficiency of Belgian officers and men. Proceeding thence to those of the French 2nd Army Corps the General found a very different state of things. "I have not seen French troops at manœuvres for over 10 years" he wrote to Sir A. Davidson for the King's perusal "and I was greatly struck with the enormous improvement in every respect. In no direction has greater progress been made than in the staff arrangements . . . . The French have succeeded in creating a General Staff and in training a school of Generals and C.O's who are second to none . . . . I have come away with the impression that its spirit is excellent, its leadership skilful, and its preparation for war thorough and complete. If in a future war it can win the first battles and thus regain the confidence in itself which was shaken by the events of 1870 and which has not yet I think been fully recovered, the French army will be hard to stop in its career of success." When the war did come the French were of course unable to win the first battles, but Grierson's remarks in general were justified by the event and the fact that they had created 'a school of Generals second to none' was undeniable.

On the General's return home he quitted the W.O. and took command of the 1st Division at Aldershot. By this time there was at length a Secretary of State worthy of the name, and Lord Haldane, building on the foundation tentatively begun by his predecessor and ably backed up by the W.O. Staff, was carrying out his searching reforms and in earnest preparing the army for war. Grierson's presence was now somewhat less essential at Headquarters, and from

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the point of view of professional proficiency it was high time for him to resume personal command of troops from which he had been absent for nearly 20 years. In his new position he achieved a great success; a success due to 'his sheer love of the army'. "He was," says his biographer, "ever out and about among his troops, exhorting, encouraging, and if need be, criticising. He had the Napoleonic gift for the opportune word." He also had the gift of handling men in the field, and gave proof of it by the way in which he defeated the 2nd Division in the Oxfordshire Manœuvres of 1909. In the following year promotion to the rank of Lieut.-General—at the age of 51 only—compelled him to his deep regret to vacate his command. The extent to which he had endeared himself to his troops was shown in the splendid—probably unprecedented 'send off' which they gave him; and appreciation was no less adequately given by Sir Horace Smith Dorrien, G.O.C. at Aldershot. For the first time in his life he found himself on half-pay and "a free man." His leisure was employed in a tour of Wellington's battlefields in Spain. At King Edward's coronation in 1911, he was in attendance on the Crown Prince of Germany, and immediately afterwards was awarded the K.C.B. In the summer Germany again threatened war in the Agadir incident, and Grierson made a tour of the French north-eastern frontier in company with Sir John French. The Kaiser heard of this tour and was furious with the tourist! In October Sir James was selected by the King to accompany Prince Alexander of Teck, who had been directed to represent H.M. at the coronation of the King of Siam. They returned to England in February, 1912.

But Grierson was longing for a command. He had hoped, and his name had been strongly recommended, not only by Sir John French but in higher quarters, for the command at Aldershot in succession to Sir Horace Smith Dorrien, but had the mortification of seeing the appointment given by the Secretary of State to an officer between 7 and 8 years his junior in the service. Grierson would surely have been the ideal man for such a post; but in such matters there are often 'wheels within wheels' and the reader must judge for himself whether the somewhat flimsy excuse that new blood was needed, was the real reason. In April 1912, the General was appointed to the Eastern Command and had been in the saddle only four months when he was called on to undergo a severe test of his capacity. Manœuvres on a large scale had been arranged, and each of the opposing forces consisting of a cavalry division and two infantry divisions: the one (Red) being commanded by Sir Douglas Haig, and the (Blue) by Sir James Grierson. But although of equal strength on paper, Haig had the advantage of a Staff, and troops trained and associated together at Aldershot, while those of Grierson's were 'a scratch pack'. According to the plan of campaign, the Red army having crossed an imaginary frontier between Wells and Hunstanton, were pushing in all parts on London, while the object of Blue was to stop it. Grierson's dispositions were brilliant and he accomplished the astonishing feat of concealing a whole Division from the enemy's air forces. After dark, this division (the 4th) advanced, linked up

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with the 3rd and outflanked the Red army. Grierson's victory was as clear as the proof that he was a master in the art of tactics.

Althought the fact is not generally known, war loomed up again that autumn, but the crisis once more passed away. The following year, 1913, was uneventful so far as the General was concerned, but in the spring of 1914 the 'Curragh incident' gave food for thought even to the most hair brained politician. In July, accompanied by Generals Haig and Allenby, Sir James attended the manœuvres of the French 11th Division, which he describes as being in a splendid state of efficiency. The long expected war broke out a very few days after his return home, and he was appointed to the command of the 2nd Army Corps, consisting of the 3rd and 5th Divisions, the 4th, that of the Eastern Command, being for the moment left in England. War Councils in Downing Street followed and important decisions were made. On August 14th, H.Q. of both Army Corps crossed over to Havre, landing next morning. In the afternoon of the 16th, the last Diary entry records 'the arrival of four transports full of cavalry, all cheering like mad.' Early next morning Sir James quitted Havre by train for Amiens. Shortly before arrival his end came, painlessly but with dramatic suddenness 'from the bursting of an aneurism of the heart.'

V.

At the opening of his introduction to "The Life of Sir James Grierson," Mr. Macdiarmid apologises for his 'temerity' in attempting as a civilian the biography. It is hardly questionable that a civilian in describing a military career labours under considerable disadvantage. His lack of acquaintance with military life and military knowledge, debars him from 'reading between the lines' and making inferences, some of which might be self-evident to the military man. Referring also to a matter of detail, the author is not always luminous as to his dates and the difficulty thus caused would have been lessened had the headlines of pages noted the year instead of General Grierson's age. But these are minor matters and the story as told by Mr. Macdiarmid, gives a mine of information; and to those who knew the General will bring innumerable reminiscences of the past. It is to be hoped that the book will have as many readers as it deserves.

As to the subject of his work, it is impossible to study the life of Grierson without realising how singularly successful and unchequered was his career. His brain expanded, and indeed matured, very early in life; and he began to take life seriously, to study military problems and to map out his future career at an age when most boys think nothing of equal importance to cricket or football. Yet anyone less of a prig could hardly be found and during the whole of his life he might have been described as a happy boy. He had three occasions for great sorrow, on the deaths of his father, mother and brother respectively, but apparently none for disappointment excepting that connected with the command at Aldershot. He would have made an admirable commandant of the Staff College, and the billet was one that he probably would have accepted with delight; but—at all events this side of the

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grave—it is impossible for a person to be in two places at once and one can hardly point to a period in which his services could have been spared for such an appointment.

As to Sir James' abilities they were incontestably of the highest order. His command of languages, his mastery of detail and his astonishing memory, would of themselves have made the fortune of any man in civil life. When a student at the staff college it was confidently asserted that he knew the station of every regiment in the Russian service. On the outbreak of war in 1914, he was as we have seen, appointed to the command of the 2nd Army Corps. It may be doubted whether his talents would not have found even more scope, had his position been that of Chief of the Staff, in accordance with the original intention. His thorough knowledge of the French and German languages and military traditions; his mastery of German mentality with its strong and weak points would apart from his technical proficiency as a staff officer—have been an invaluable asset to the Commander-in-Chief and would certainly not have disqualified him as a successor in due course to the latter. The measure of success which Sir James would have attained as C.-in-C., can of course be matter for conjecture only. But without fear of contradiction it can be asserted with confidence that his talents, versatility, temperament and power of handling troops in the field marked him as pre-eminently fitted for the part, and it is by no means impossible that, had he occupied it, he might have proved himself one of the greatest Generals of the day. But, 'dis aliter visum est' and his reputation will rest, not on possibilities or probabilities, but on solid work admirably planned, and admirably executed. It has been shown by his biographer, that despite his respect for Germany, and his intimate association with many German officers, his sympathies from the outset of his career lay with France; yet he would gladly have retained friendship with Deutschland but for the conviction slowly but surely acquired that friendship with her was impossible and that her occasional and rather spasmodic overtures were merely a camouflage for concealing her designs against England. As Military Attaché he was determined to realise facts whether pleasant or the reverse, and whether or not those facts coincide with his pre-conceived ideas.

But among all the General's qualities the greatest was his love for his fellow man, particularly his comrade in the army, whether that comrade was of highest or lowest rank. There are men who believe that in order to ensure respect it is necessary to hold themselves aloof from those whose social position is not their own. Grierson, during the whole of his life, went on precisely the opposite tack. He realised the fact, that it is not by coldness and reserve, but by friendly association and sympathy that respect is earned and discipline furthered. With complete success was his view carried out: he won the hearts of all whether officers or other ranks; and for his own part would have reckoned his many rewards and decorations as dross in comparison with the far spreading expressions of love elicited on his death, and the tears shed on the grave of 'Jimmy Grierson'.

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DOCTRINE AND THE PRINCIPLES OF WAR IN F.S.R.

BY COLONEL H. ROWAN-ROBINSON, C.M.G., D.S.O.

DOCTRINE.

"THE army will be trained in peace and led in war in accordance with the doctrine contained in this volume."

So begins that portion of the Field Service Regulations which deals with "Operations." It is a very definite and decided statement. The General Staff will have no "Idols of the Den" to "intercept or corrupt the light." They expound a teaching based on the history of the ages and on the experience of the great world-war; and therefor they accept full respo[illegible] The statement makes pleasant reading; for it takes cognizance of the soldier's cardinal need for direction and decision. Doubt and uncertainty kill the bravest spirits; but here the trumpet gives forth no uncertain sound.

The question of the value of a military doctrine has been much debated. Its opponents hold that it tends to cramp initiative in thought and action; and that, as the direction of war is not an exact science, and as there is a constant process of change in every branch of worldly activity, it is as likely as not that a false or obsolete doctrine will be inculcated. They show that the disaster of Jena, was due to an acceptance of the teachings of Frederick after they had ceased to apply; that, in 1870, the French based their hopes on the strength of defensive positions; and that, prior to 1914, the French General Staff sought to inculcate a doctrine whose value was so disputed both in France and elsewhere as to throw serious doubt upon its efficacy. The protagonists of doctrine—those whose judgment is not vitiated by obsession with pet theories—maintain that a doctrine should be built, not on the shifting sands of contemporary opinion, but on the bedrock of certain unchanging principles to the truth of which all history vouches. These principles are few in number, short in description and clear in direction; yet in their application lies the whole art of leadership in war. Their acceptance will direct rather than cramp initiative for they will act as sign-posts for every kind of military action. The main requirement for assimilation is a prolonged study of military history. Mere statement does not suffice; it must be followed by convincing proof. Once a doctrine of this nature is understood and accepted, commanders and staffs will communicate within its limits in terms with which all are thoroughly conversant. Louis Stevenson puts the matter in a nut-shell—"A dogma learned is only a new error . . . . but a spirit communicated is a perpetual possession.

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It is the custom to add largely to the list of accepted principles; but this is a doubtful and dangerous practice. To take a common example: "No commander should allow his force to be shut up in a fortress." The statement is true but it is merely the particular application of a principle, that of security: "The security of a force *and of its communications* is the first responsibility of a commander." Sir John French records that his knowledge of military history, warned him not to allow his army to be shut up in Maubeuge, out of which it could not have emerged but as captive. There is, however, some danger in thinking of avoiding a fortress rather than of the principle involved. Liège and Namur were both evacuated by the field troops before there was a serious danger to their communications and when a more prolonged stay might have held up the German advance to the advantage of the Allied concentration. On the other hand, Plevna was defended too long. For weeks it delayed the Russian advance; but Osman Pasha should have retired before his communications were effectively threatened. A fortress does indeed offer the dangerous attraction of shelter and temporary protection to a beaten army; but a commander should base his decision as to occupation or otherwise, and as to term of occupation, on the possibility of keeping open his communications.

Take another example: "Victory is to him who has the last reserve" is a saying of Napoleon that is often quoted as a principle. But it is at times dangerous to apply. The Russians, for example, at the battle of Nanshan, had 17,000 men available, of whom they kept 13,000 idle in reserve, while the remaining 4,000 were beaten after a most gallant and desperate bid for victory. Napoleon himself failed to achieve decisive success at Borodino by retaining the Guard in reserve till the battle was over. Reserves are meant to be used. The plan of trying to exhaust the enemy's reserves before employing one's own may lead to protracted and indecisive operations and conflicts with the real principle which demand the ruthless employment of force in battle. Leaders, instinct with genius, may occasionally time their strokes, as Napoleon did at Ligny, to fall when the enemy has put in his last reserves; but such examples are difficult for the ordinary mortal to follow. Mystify and mislead the enemy; strike hard, unexpectedly and in a decisive direction; and the enemy's reserves will be involved in the defeat of the rest of his army.

THE PRINCIPLES OF WAR.

Moral.

The principles of war are for the most part inter-dependent and their order of importance is not a matter of much moment. Pride of place may, however, justly be given to the principle that "Success in war depends more on moral than on physical qualities"; for so many other principles in the application of force derive their value from effect on moral. Napoleon has stated that "Moral force is to the physical as three to one." Nearly 2,000 years earlier Sun the

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Master said: "The good fighter seeks victory from spirit"; and Wan the Master that "in war there are four important influences—first, spirit . . . . fourth, force."

There are many aids to moral: patriotism, leadership, discipline, training, religion, a good cause, hatred of the enemy, good nourishment; and of them resolute and skilful leadership is the greatest. The moral of soldiers will stand many a defeat provided there be confidence in the commander; witness the final success after so many failures that crowned the efforts of Washington and William of Orange.

After leadership, training is the most powerful factor. Transfer the jockeys in the Grand National to man a lifeboat in a storm, and you may find a crew of cowards. A man must know his metier, and above all his weapon or, when danger comes, his spirit will surely falter. Discipline is the stay rather than the furnisher of moral. It holds the soldier to his work when horror of circumstances and mortal fear might otherwise materialise in flight or paralysis.

Patriotism, religion, a good cause, hatred of the enemy, are useful adjuncts, but alone of little value. Austria in 1866 and France in 1870 were as patriotic as Germany and had a better cause, but they were beaten. Religious fervours have generally to contend with religious fervours. Where forces are fairly evenly balanced, however, one of these minor aids to moral may assume a decisive importance. The Russian soldier, for instance, had not the cause at heart against Japan, for he believed the war to be fought in the interest of financiers; whereas the very soul of the Japanese soldier was in the war.

The Objective.

"The ultimate military objective in war is the destruction of the enemy's main forces on the battlefield, and this objective must always be held in view."

This principle is even more important for the national leaders than for soldiers. The neglect of it has perhaps occasioned more loss than the neglect of any other principle. For three years Abraham Lincoln, one of the ablest of modern statesmen, tried to direct a war without obeying it. He then handed the direction to Grant who followed its guidance unswervingly till he received Lee's surrender at the Appomatox. Civilians generally cherish the hope that wars may be won without heavy fighting and consequent cost in lives and money. The few bloodless victories of great conquerors have fascinated and riveted their attention, and they fail to realise that the men who have won their admiration have gained most of their victories, not bloodlessly, but by the most ruthless application of force.

"There are many good generals among my opponents," said Napoleon, "but they see too many things. I see only one thing—the enemy's main army." This was in his first campaign. His aged opponent Beaulieu was occupied with three ideas: to gain touch with Nelson; to occupy a little more territory; to prepare winter quarters. Napoleon aimed at nothing less than the complete defeat

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of the combined Austrian and Sardinian forces. Sir William Howe, though a skillful soldier, sympathised with the Secessionists and sought to achieve his ends by a mixture of force and kindness. Similar methods characterised the leadership of the Federals in the American Civil War, and of the British in the South African War, in the early indecisive periods of these campaigns. Half measures in war are fatal. *Carthago delendum est.*

It is not indeed always possible to attack the enemy's main forces at the outset, but the initial plan of campaign should be so shaped, according to the intelligence available, as to give high probability of striking them, and that at a disadvantage. The Germans could only surmise where the main French forces would be found and they planned to envelop their left wing. Von Kuhl[1] gives a map showing both the actual and expected positions, and they do not differ to any serious extent. The plan was sufficiently bold to ensure the envelopment of whatever line the French might have adopted; and a battle with chances in favour of the assailants was therefore nearly certain to develop.

If the enemy's main forces cannot be brought to battle, operations should be directed against whatever he may cherish most. It is important, however, as soon as this action shall have had the desired effect of drawing the enemy's forces within striking distance, that the subsidiary objective should be at once abandoned for the main one.

The battle is not complete without the pursuit. The enemy should be given no opportunity to rally. His remaining formed bodies must be overthrown, his centres of resistance, supply and reinforcement, more especially his capital, occupied. "In warfare nothing is done so long as anything remains to be done: no victory is complete so long as an enemy is in the field." Napoleon occupied Moscow after Borodino, but Kutusov still retained an effective fighting force. Hannibal, on the other hand, won a great victory at Cannae, but failed thereafter to occupy Rome. After Jena,—Halle and Berlin; after Waterloo,—Paris; after Tel-el-Kebir,—Cairo. These should be our models.

"*Victory can only be won as a result of offensive action.*" This sounds indeed like a platitude. Nevertheless it is essential that it should be stated and re-stated so that the truth may be fully realised. There is a natural tendency on the part of a man or an army attacked to assume the defensive, and a further tendency to lazy content after having repelled the attack. The defensive is, however, a purely negative policy and can only be followed by negative results. Ludendorff at the close of the Great War is stronger than ever in favour of the offensive. Sun the Master, held the same view: "But while victory is easy in attack, it is difficult in defence."

The defensive always offers many attractions: knowledge of the field of battle; cover both natural and artificial for defenders; exposure for attackers; convenience of supply and reinforcement etc., but they are well known to be illusory. An unjustifiable defensive is

[1] *Das deutsche Generalstab*, p. 48.

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indeed often adopted in war but generally from weakness of will and lack of skill rather than from conviction. The defensive as a rule, only finds advocates in peace when the introduction of some new weapon—the breachloader, the machine gun—appears to make it doubly strong. The theory that improved weapons add strength to the defence does not of course bear examination for a moment. The offensive implies the initiative; hence power of manœuvre; hence power of concentrating superior forces at a decisive point; and hence a superiority at that point of these new weapons. In fact, if in superior force—the components of force being mass, mobility and moral—it is well to attack. On the other hand offensives, such as those adopted by the French in the opening stages of the wars of 1870 and 1914, without due care in planning and without staying power, are certain to fail; and a repulsed offensive is very costly in lives. If in inferior force it is well to manœuvre and await an opportunity rather than occupy a defensive position. Victories of the type of Austerlitz and Salamanca, where a defensive attitude was followed by a decisive counterstroke, are as difficult of execution as they are rare in occurrence.

Offensive action carries with it important subsidiary advantages. It is the cheaper form of war as regards casualties—a point that was strongly brought out in the German and Allied attacks in 1918 and on which Ludendorff lays the greatest stress in his comments. It enhances moral greatly. The spirit of the British Expeditionary Force had reached a low ebb by the end of the retreat from Mons, but when the order to advance was given there was an instant and complete recovery.

If neither side take a decided offensive, the war may be prolonged indefinitely to the ultimate ruin of both belligerents. When the means are available there should therefore be no hesitation. That soldier serves his country best, who brings a war not only to a successful, but also to a rapid conclusion.

Both parties will ordinarily adopt the offensive at the opening of a campaign. Preparation, relative rate of mobilization and deployment, moral, skill, numbers,—all have a voice in the decision as to which side shall maintain that rôle. Where there is an approximate equality in these matters a temporary stalemate may occur as in 1914.

Surprise.

"*Surprise is the most effective and powerful weapon in war.*"

In war there is a constant combat of wits between opposing commanders. The leader who can disturb the mental balance of his adversary is far on the road towards the achievement of victory. There is no weapon better suited to this purpose or to the purpose of reducing the enemy's moral than surprise. It may take either a strategic or tactical form. Byng's attack at Cambrai combined both forms.

Secrecy in counsel and rapidity in movement are the essential elements of surprise. The extent to which, and the time when, subordinates may be informed of a plan must always be a matter for serious consideration. The more the plan is known the greater

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usually will be the keenness, and the more intelligent the co-operation of all ranks, and thus the more effective the preparation; on the other hand the greater will be the danger of the discovery of the plan by the enemy and the consequent probability of failure. As a rule the results achieved are in direct proportion to the secrecy maintained. The method adopted in the succession of British victories in 1918, is well worthy of study. Subordinate commanders were successively 'let into the know' at the last moment compatible with the effective execution of their particular preparations.

The means of effecting surprises are many and various. They begin in peace. Every endeavour is made to conceal from a possible adversary details as to numbers, plans, rate of mobilization, etc.—a difficult matters with national armies. The mobilization schemes of the Great Powers were for the most part common property, as were the range and power of nearly all guns, rifles and machine guns. Nevertheless the central powers managed to effect three great surprises in the opening stages: the deployment of a large number of reserve divisions; the utilization of super-heavy siege howitzers; the wide sweep through Belgium.

Once trench warfare supervened the strength of the local defence rendered necessary such huge preparations for its defeat that secrecy became increasingly difficult. Immense masses of guns were required to destroy the enemy's trenches, wire and machine guns. The latter had to be bombarded for days before the delivery of the assault. The enemy, therefore, had full notice of the attack and made his counter-preparations accordingly. It grew clear that mere concentrations without surprise would never achieve great results. In the meantime the great brains in the world were busy with the problem of piercing a defended line, a problem which for the moment had become scientific and mechanical rather than physiological or psychological. Skill of leadership, bravery and endurance were at a discount. The German attempt at solution with cloud gas came as a complete surprise and proved effective; but the attack was not delivered on a scale sufficiently large, nor was the initial success pursued with the vigour needed to secure a decisive victory. In the summer of 1916, we repeated the main German fault by employing an insufficiency of tanks on the first occasion of their use. It may be argued that lack of success was due to bad design and absence of co-operation with other arms, but most spectators of the first performance of the tanks are of opinion that a multiplication of their number by four would have effected a complete breach in the German line. The main lesson to be learnt from these failures is that a great new invention should be employed for the first time on a scale calculated to ensure decisive effect and that its appearance on the battlefield should synchronize with offensive operations of the first rank. Surprise works mainly by its moral effect. Anything is effective that is new, strange and sudden, upsetting to the mental balance of the leaders and to the nerves of the men—an ambush, a night attack. gas, tanks and other devilments still in the womb of the future. As to scientific or mechanical devices, decisive success can only be expected of them in the initial attempt. After that they fall into place with other weapons of war—in the first, second or third rank accord-

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ing to circumstance. That tanks transgressed this rule by finding a second life and achieving great success at Cambrai, was due to several causes : the preparations for the attack had been long, methodical and secret; the assault was delivered without any preliminary bombardment and effected a complete surprise; tanks were employed for the first time in really large numbers; the locality chosen for their operation was well suited to their capabilities having been but little damaged by shell fire and being free, except on the attackers' side, from forest; after the comparative failure of tanks at the Somme and their complete failure at Bullecourt, the enemy had begun to despise them and had allowed his counter-measures to fall into disuse. Such an array of favouring circumstances may well be held to be exceptional.

The surprises of the future will again be effected by scientific and mechanical means, applied by the light of the ancient and everlasting principles. To find funds for experiments in this direction, there must be some reduction of numbers, and some risks must therefore be taken in our far-flung police work in the replacement in suitable regions of men by machines.

Mystifying and misleading the enemy, of course, play an important part in effecting surprise. The methods are legion: the spread of false information and rumours—in the home press, in the neutral press, by wireless, among the troops, especially those in the front line; false or dummy concentrations; feigned retreats, etc. The reported transport of Russian troops through England in 1914; the transfers of small units prior to the battle of the 8th August; the devices of Marlborough for forcing the *Ne plus ultra* lines—furnish familiar examples.

Concentration.

In dealing with surprise it was pointed out that a concentration of troops, however well placed and timed, might be of no value unless it could be secretly effected and the force applied without warning. If the enemy be permitted to make equal and opposite concentrations, bloody and indecisive battles may ensue. Again, surprise by reducing the enemy's moral multiplies enormously the superiority of force at the point of attack. It is clear, therefore, that a surprise should be effected if possible. But this cannot always be done. In many great battles the element of surprise has been wholly absent—at Pultawa, Blenheim, Vittoria, Sedan, for example, and in many of our great trench battles. The skilful leader will, therefore, not depend for success wholly on effecting surprise. He will in any case endeavour to concentrate superior force at the decisive time and place by all means in his power, effecting his purpose largely by economy of force in other directions; that is by skilful use of detachments. Napoleon, though weaker than his opponents in the whole theatre of war was stronger, numerically, on the field of Austerlitz. On the other hand, in the Great War our large detachments in the East were, up till the middle of 1918, to a great extent responsible for our inability to concentrate sufficient forces against the Germans in the West.

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Economy of Force.

Force may be said to consist of mass, moral and mobility. Any measures, therefore, that can increase these three factors at the decisive time and place without detriment to the general situation, may be regarded as truly economical. The application of the principle of economy of force requires above all a central military control. An Aulic Council, a Cabinet of twenty-two Ministers, or even able civilian autocrats like Abraham Lincoln, will certainly disperse force in extravagant fashion. They want to be secure at all points. A little skilful mystification and the spread of false information by their opponents, and they will guard every possible avenue of attack. Thus the first battle of Bull Run and Jackson's Valley Campaign rendered the Federal Government so anxious for Washington that they wasted their vast army in ensuring its defence, and consequently failed for many years to concentrate decidedly superior force against the redoubtable Lee.

Detachments are generally expensive. Each detachment-commander sent off on a separate task becomes convinced, according to his character, either that his task is of supreme importance, and therefore requires every man who can be spared to it, or that the enemy has singled him out for attack in overwhelming force. It is not necessarily his fault. He may have been set a task for which his force is inadequate and is in that case wholly justified in demanding reinforcement. A strong central control adjusts these difficulties; and the more easily when the various sub-commanders are men like Lord Hill of Peninsular fame or like Generals Maude and Allenby in the Great War, who realized accurately their own responsibility and and the rôle of their forces in the general plan.

When an autocrat is also a military leader as was the case with Napoleon, or when control is vested in the hands of a central body of high prestige and long standing, such as the German great general staff, an economical distribution of troops is a comparatively easy matter.

Stonewall Jackson provides a classic instance of economy of force. Having by his Valley Campaign forced the Federals to dissipate the forces intended to reinforce McClellan, he himself marched on Richmond and arrived in time to help Lee to gain a great victory there.

Force may be economised, too, "by the correct distribution and employment of all resources" especially with regard to lines of communication, to ground and to climate. The short line is economical in man-power and easily defensible; and, *ceteris paribus*, should therefore be adopted. Employments behind the line should be reduced to a minimum in order to attain a maximum percentage of guns and bayonets to ration strength. As regards ground—the main approaches to a country should be defended by fortresses or defended areas, if only to counter the wish of the amateur strategist to place an army at each. Fortifications, permanent or field, can be held by relatively small forces or by troops of a relatively low value. The fact that tanks and aeroplanes can attack from almost any direction does not seriously affect this question, for the bulk of these weapons will be with the main armies, and their detachment on subsidiary

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enterprises will be generally unproductive. Moreover, the day is yet distant when tanks and aeroplanes will be independent of railways for their supply. It is common to hear fortresses disparaged since the war but they played a great part nevertheless: Liège in holding up the advance of the Germans; Maubeuge in blocking their communications; the eastern fortresses in economising troops that were made available for Foch and Manoury. The battle of the Marne might well have had an unhappy issue for us without their aid.

As regards the nature of ground, numbers can be economised where the country is mountainous, difficult and strong for defence. As to material: it is unsound to send a 15″ howitzer to the Dardanelles where it cannot be landed; or to push more guns forward over difficult country than can be efficiently supplied with ammunition. As to climate, it was good policy to employ Indian troops for the most part in Mesopotamia and Palestine, and British troops in the Western theatre. Finally, immense economy of force may be effected by discipline, good staff work and organisation.

Security.

"The security of a force and of its communications is the first responsibility of a Commander."

Surprise is as ever the keenest weapon of war; and the soldier and the scientist combine together, therefore, to scheme for its achievement. Study the preliminaries to any great attack in 1918 and note the energy and brain-work expended in camouflaging the concentration of guns and the transference of corps, in confusing the wireless waves and in drowning the sounds of tanks and traffic! Consider also the attack itself, delivered without warning through clouds of smoke which concealed its strength and direction! Look again at the battle of Cambrai and the lightning success that ensued there on new methods of warfare! And, viewing all these matters, what extraordinary measures of security seem necessary to safeguard the very existence of a force! What endless sources of intelligence! What bold reconnaissance! What unceasing vigilance! What bitter fighting for the mastery of the air and of the outposts! And yet desperate as is the need of security it must not be allowed to degenerate into an excess of caution. The bold commander will seek to cover his movements with a cloud beyond which lie the eyes of his army—his intelligence agents, his aeroplanes, his patrols—watching the movements of the enemy, less in fear of them than with a view to profiting by their mistakes. He will utilise this cloud, not so much for defence, as to enable him to manœuvre for the delivery of a surprising and effective blow. And in adopting this procedure he will acquire the greatest of all guarantees of security—a moral ascendancy over his opponent.

Decisive victory can only be gained by seizing the enemy's communications either by penetrating or outflanking his army. To this end every great offensive movement has been directed. It was for the protection of communications that the vast network of trenches in

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France and Flanders was created. Security of communications is first sought in the plan of campaign, in which it is usually arranged that an army shall advance covering its communications and at the same time, if possible, threaten those of the enemy.

The campaign in Russia furnishes a most apposite object lesson in the need for security. A vast army of nearly half a million moving in many columns from a wide base; the concentration to a single line of advance; the arrival of the Emperor at Smolensk with his forces reduced by a third and the enemy yet unbeaten; the question that arose whether to consolidate his position and communications or to make an adventurous advance inconsistent with the principle of security; the decision to advance on Moscow; the gathering of the vultures—Wittgenstein to the north, Tormassov and Tschitschagov to the south; the simultaneous realisation by Napoleon and by Kutusov that the insecurity of the French communications would prove decisive of the campaign; the retreat; the successive struggles of the French at Kaluga, at Krasny and the Beresina to keep or regain connection with the base; the moral ascendancy of Napoleon which still sufficed at these successive actions to save his army from destruction; and, finally, the arrival at Danzig of 8,000 famished men, the last formed remnant of the gallant host which had set forth with such high hopes of conquest.

Ordinarily, the enemy's communication is sought by a blow in the flank but, in France, in the absence of flanks, penetration was tried; and, so difficult did it prove that, on the Allied side, attempts to reach or even to threaten the enemy line of communications were abandoned, and the system known as that of the limited objective introduced. This system was of course only a *pis aller* forced upon us by our failures against heavily entrenched lines, due to the difficulty of combining surprise with concentration. It set a limit to victory and was not adopted without strong protest. It was held that failures in penetration had been due rather to faulty leadership than to impossibility of achievement; that opportunities had been lost at the first employment of gas and tanks by not using them in large enough quantities; that our reserves had been wrongly placed or badly handled at Neuve Chapelle, Festubert and Loos; that our cavalry had been put in too late at Arras. However, the limited objective held the field till Caporetto and Cambrai, St. Quentin and Le Chemin des Dames proved that a return was possible to normal methods even in the western theatre; and much anxious thought was once more given by beaten commanders to security of communications.

Modern weapons assist materially in affording security, for aeroplanes give early notice of an attack, and mechanical transport enables troops to be rapidly despatched to reinforce threatened points; but they also render an army more than ever susceptible in its communications. Men and horses can subsist for limited periods on reduced rations and without medical and veterinary appliances, but let the supply of petrol and of spare parts cease, and the mechanical services are at once thrown out of action.

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Mobility.

It is only by virtue of a high comparative mobility that a leader can hope to achieve surprise and apply force successfully at the decisive point at the right moment. It is only by virtue of the same quality that he can effect a ruthless pursuit and thus turn the victory gained into an irremediable disaster for the enemy.

The collective mobility of an army, like its moral, depends first and foremost on the character of the commander. If he be quick and decided, if he can rapidly form a plan and execute it unwaveringly, his force will have an enormous advantage in movement over that of a hesitating opponent. Other aids to mobility are discipline, organisation, training and a light equipment. Constant obedience to orders, especially those regarding march discipline, regulation of traffic, plunder and drink, lies at the root of the matter. When the Germans retired to Bullecourt in the spring of 1917, the Albert—Bapaume road was blocked for 36 hours by a mass of vehicles, and effective pursuit was therefore out of the question. After Vittoria, Wellington's troops dispersed in the mountains to plunder, and many of the fruits of that great victory were consequently lost.

Mobility depends too on good staff work—in the rapid issues and distribution of orders, the sound allotment of routes and of billets, the regular supply of food and fuel, and in the maintenance of roads and railways. Take one of the above matters alone—the distribution of orders. The mobility of Napoleon's forces was proverbial, yet on two important occasions—once in 1807 and once in 1815—a portion of his force failed to act because the order to move did not reach it, and the staff failed to note that the receipt of the order had not been acknowledged. Again, just as in all other great competitions, the competitors in war must train strictly. Wars break out suddenly. Relative mobility, especially at the opening of the campaign, may prove decisive of the struggle. Hence men and horses must be thoroughly fit, equipment, especially boots, must be well fitted, and vehicles in running order. As to a light equipment, it is, compared to the other factors of mobility, a minor matter. The Roman legionaries and the heavily burdened soldiers of Napoleon generally outmarched their more lightly weighted adversaries.

Mobility in the pursuit is less easily attainable than might be supposed. Such wholly successful pursuits as Jena, Waterloo, Palestine, have been rare. The reasons for this lie in human nature: the fatigue caused by the huge efforts made to achieve success; what Müffling calls "the digestion of joy caused by victory"; the habit acquired at manœuvres of settling down to dinner as soon as the last position is carried. To enable an effective pursuit to be carried out, it must be well organised in advance. The action of cavalry, tanks, aeroplanes and guns must be carefully co-ordinated, the utmost use made of the available mechanical transport for the carriage of infantry, machine guns, supplies and road material at the expense of the less mobile units of the army; and all captured enemy material —guns, rifles, ammunition, stores—must be fully exploited. To expect all these things to happen without preparation is to court failure.

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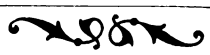
In peace the cry is all for mobility; in war, all for power. Now biassed by trench warfare, we lean perhaps too much towards power. But that phase will soon pass. The peace-cry for mobility at the expense of power has great advantages for, as stated above, in the earlier operations of a campaign, a high relative mobility may well prove a decisive factor. If a decision be not quickly reached, however, there will certainly be a cry for more heavy guns and more engineering equipment. It is for the General Staff to hold the balance, remembering that the value of victory is greatly enhanced by brevity of operation, and incurring legitimate risk by weighting the scales in favour of mobility.

Co-operation.

Co-ordination of effort of all forces—naval, military and aerial—in the theatre of war and co-operation of the various arms in battle, form the summit of endeavour towards the achievement of victory in the fields of strategy and tactics respectively. The establishment of a Ministry of Defence on the lines most generally proposed should go far towards solving the first problem. The co-operation of all arms for battle is mainly a matter of training and liaison. It is team-work in its highest form and can be attained by careful attention to the training manuals, and, on the part of each arm, by the study of the capabilities and limitations of the other arms and by the maintenance of a close personal touch with them.

Difficulties arise, however, owing to the multiplicity of special weapons employed: aircraft, with their uses of reconnaissance, machine gunning and bombing; tanks; guns—light, medium and heavy; trench mortars; rifles; etc. It is no light matter to acquire knowledge of all these weapons—and to make friends with all the people who handle them. However, no more in soldiering than in other walks of life are there short cuts to high success.



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COLONIAL DEFENCE FORCES AND THEIR CO-OPERATION IN THE DEFENCE OF THE EMPIRE.

BY CAPTAIN M. N. T. GUBBINS, O.B.E., M.C., R.G.A.

IN 1887, the first Colonial Conference was summoned by the Colonial Office to attain a better understanding as to the system of defence which may be established throughout the Empire. The principal result was an agreement for ten years between the Imperial Government of the Australasian Colonies to strengthen the Royal Navy in Australasian waters, the colonies paying a contribution towards the total cost.

In 1897, there was another Colonial Conference in London. The Australasian naval agreement was maintained; the Cape offered the cost of a first class battleship for the Royal Navy. The War Office promised facilities for securing uniformity in arms and ammunition, and a suggestion was approved that there should be occasional interchange of Military Units between the Mother Country and the Colonies.

There is no doubt that at that time little had so far been done towards organizing the defence of the Empire upon any comprehensive scale. The policy was beginning to be framed, however, whereby each Dominion should have twin forces, garrison troops to protect strategical centres, and field troops, a mobile force for active operations.

A Colonial Defence Committee had been formed in 1885, a Defence Committee of the Cabinet was established in 1895, and at the time of the South African War in 1901 or 1902 the Committee of Imperial Defence came into existence with the Colonial Defence Committee as a sub-Committee. Its duties were to advise and assist the Cabinet in whose hands lay the higher direction of Naval and Military operations. It grew, however, and gathered strength and soon in practice it did more than advise, it decided. In 1903 the Canadian Minister of Militia sat as a member, and in 1905-06 a general scheme of defence for Australia emanated from it.

In 1902 Mr. Seddon, the Prime Minister of New Zealand, proposed for consideration at the Colonial Conference of 1902 that each Dominion should form an Imperial Reserve Force for service in case of emergency outside the Dominion.

The South African war had shown that the regular army, as organized before the war, was by itself inadequate in strength to the need of the Empire, but that the self-governing colonies were willing and able to assist in making good some part of the deficiency in military strength, but the necessity of being able to rely upon colonial contingents of definite strength and efficient both in training and in

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equipment was emphasized by the War Office. The subject was discussed at the Colonial Conference in 1902. The Prime Minister of Cape Colony and Natal agreed with the New Zealand view, but the representatives of Canada and Australia held that to establish a special force, set apart for general Imperial service, and practically under the control of the Imperial Government, was objectionable in principle as derogating from the powers of self-government enjoyed in Dominions. The result was that Mr. Seddon's motion was shelved.

The Conference in 1902, marked, however, a distinct advance in Imperial co-operation on the sea. Lord Selborne, the First Lord of the Admiralty, contended that Naval defence consisted in taking the offensive, in a concentrated, mobile, striking force, not in divided, localized, and comparatively passive squadrons. A single navy under undivided control, moved by a single authority was necessary. He was not content with a money contribution such as Australia and New Zealand were giving, he wanted the overseas people to look upon the navy as their own and he wished to see in it more Colonial Officers and seamen; he was afraid that Canada, Australia and South Africa should become too continental and too little maritime in their ideas.

This was distasteful to Canada, who was aiming at a naval force in Canadian waters; proposals for a contribution, monetary or personnel, to a central fleet, did not coincide with their views on self-government.

Australia was in favour of making "The Royal Navy the Empire Navy" supported by the whole of the self-governing portions of the Empire. The agreement of 1887, by which the Royal Navy in Australasian waters should be strengthened, was renewed for a further period of ten years. Annual contributions were increased by Cape Colony and Natal and also Newfoundland.

The South African war had given for the first time practical experience as to the requirements of the Empire from the point of view of soldiering and defence; the defects, the want of system and uniformity had been made patent; the overseas people had co-operated on an appreciable scale, but all practical proposals in the direction of co-ordination were met with opposition whenever they had any semblance of external control. The great problem then, AS IT IS NOW, was how to secure uniformity needed for purpose of war and common defence without clashing with their views of self-government.

The agreement regarding the strengthening of the Royal Navy in Australasian waters with a contribution towards the cost to be paid by Australia was distasteful to the Commonwealth, and in 1905 her Prime Minister wrote that "No patriotism is aroused, while we merely supply funds that disappear in the general expenditure of the Admiralty."

Canada still stood aloof from any concerted action with regard to the naval defence of the Empire, and made little sign of providing for her own naval defence.

Germany was launched upon her naval career, naval defence was occupying more and more attention, and in 1904 a strong deputation to the Prime Minister, Mr. Balfour, urged that the self-governing colonies ought to take a greater share in the burden of Imperial Defence.

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In the infancy of the defence forces in the self-governing colonies it was obviously expedient that the commanders of the forces should be selected officers from the armies at home. Such appointments from home were bound to contain elements of friction, and such a case arising when Lord Dundonald was in command of the forces in Canada, resulted in the abolition of a C.-in-C. in favour of an Inspector General and Chief Military Adviser of the Government.

In 1903 and 1904 Australia passed Defence Acts under which all male citizens between the ages of 18 and 60 were declared to be liable to serve in time of war, enlistment in peace being voluntary. The defence force was defined as consisting of permanent and citizen forces, the permanent force being composed of soldiers and sailors enlisted for continuous service for a specified term, while the citizen force comprised a paid militia as well as volunteers.

The next Colonial Conference met in 1907. It was memorable, among other reasons, for the presence of General Botha, as Prime Minister of the Transvaal, now a self-governing colony.

The South African war was not a war upon which to base conclusions applicable to future wars especially in Europe. The Russo-Japanese war was, it had demonstrated that "War in the present day is becoming more and more an exact science."

At the 1907 conference, Lord Haldane explained the principles that were being put into practice. War having become more than ever a science, it was essential to keep the organization and administration of the army in peace, distinct from the service which consisted in the study of war problems and in the higher training of staff and troops. This latter service entailed provision of a brain for the army in the shape of a General Staff, such as had been created in 1906. As to the army itself, preparations for war involved two forces with distinct functions. The navy always the first line of defence, with the territorial force behind it as a second line under no obligation to go overseas. But there was need also for an expeditionary force, designed for service overseas, and for troops to police the Empire in peace and war. To these ends the regular army had been organized. The staff should be given an Imperial character, to welcome to it officers from overseas, and to lend the services of its members to overseas forces. The desirability of having an Imperial reserve of officers was suggested.

Four military papers were placed before the Conference :—

1. *The strategical conditions of the Empire from the military point of view.*

Supremacy on the sea must be in the forefront of the Defence of the Empire, but all the component parts of the Empire should each maintain sufficient troops for self-defence and be prepared to give mutual support to each other upon definite lines in case of emergency. To this end they should all adopt systems of military organization capable of being assimilated to one another. Training and adequate preparation were of paramount importance. The General Staff would form a bond of union including officers from all parts of the Empire. Much more should be done in the interchange of officers, and it was suggested that whole units might be interchanged.

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2. *The possibility of assimilating war organization throughout the Empire.*

This paper recommended uniformity in the military terms used, in the number and composition of each unit, in the grouping of units, in the provision of administrative services, the natural result of which would be a great addition of strength derived from organization on common lines.

3 *and* 4. *Patterns and provision of equipment and stores for Colonial Forces. The desirability that Colonial Governments should give their orders for ordnance stores, particularly arms and ammunition, through the War Office.*

These papers had the same object in view, that of making ready for war in uniform fashion, ensuring for instance that troops likely to be called on to fight side by side should be supplied with the same ammunition.

These proposals were of great historical interest. It was clearly realized that in all matters of domestic concern, in the military as well as in the political sphere, the Dominions were masters in and of their own houses. No attempt was made to revive the plan of earmarking special bodies of Imperial Service Troops; no guarantee was asked that contingents of given strength and composition should be forthcoming in case of war; no word was said of exercising any authority or control from home. The General Staff was purely an advisory organization in which partnership was invited on terms of complete equality. Uniformity of organization to enable diverse contingents to fit in with each other was what was asked for.

The outcome of the discussion was a unanimous resolution in favour of a General Staff, and sound practical results followed. The Dominions agreed that the General Staff, selected from the forces of the Empire as a whole, should study military science in all its branches, collect and disseminate military information and intelligence to the various Governments, prepare schemes for defence on a common principle, and without interfering in questions connected with command and administration should at the request of the respective Governments advise as to the training, education and war organization of the military forces of the Crown in every part of the Empire.

The 1902 Conference had contributed little towards the military defence of the Empire, but had been comparatively fruitful on the naval side. In 1907 the parts were reversed. The suggestions with regard to a General Staff led to fruitful results, but little advance was made with regard to naval defence.

In 1905 the Australian Commonwealth had expressed its dislike of the naval agreement. In 1906 the Imperial Defence Committee had, by request, supplied the Commonwealth with a complete scheme for the defence of Australia on land and sea, repeating once more the doctrine of a single fleet under one authority, and combating the growing desire among Australians to have a fleet of their own. The naval officers of the Commonwealth in turn criticized the scheme and put forward detailed proposals for a separate Commonwealth flotilla

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of destroyers and torpedo-boats to be supplementary to the Royal Navy. Then came the Conference, and the First Lord again emphasized the necessity for unity of control, but intimated that the co-operation of the colonies would be welcomed in the form most agreeable to themselves, and that whether they gave or not, the Admiralty acknowledged their own obligation to defend the King's Dominions over the seas. Canada still stood aloof from any naval co-operation.

There was far more aftermath from this conference than on former occasions. The General Staff justified their existence and outlined a scheme of expansion into an Imperial General Staff. The scheme comtemplated a central body in London under the C.I.G.S., local sections in the U.K., local sections in each of our regular garrisons abroad, in each self-governing Dominion, and in India. In a self-governing Dominion the Chief of the local section of the General Staff would be the adviser and under the control of the Dominion Government, in close communication with, but not under the orders of the C.I.G.S. Great stress was laid on the necessity of establishing staff colleges in the Dominions and of encouraging overseas officers to make the fullest possible use of Camberley as the central school of military education for the Empire. Shortly after the conference the Australian Government foreshadowed compulsory military training on land, and the creation of a Commonwealth flotilla consisting largely of submarines, the importance of which had been emphasized at the Imperial Conference. In deference to Australian wishes the Admiralty worked out a scheme for the establishment of a local defence force, a Commonwealth flotilla, which was sent to Australia in 1908. New Zealand further accentuated her dissent from the Australian view of naval defence by unconditionally increasing her contribution to the Royal Navy from £40,000 to £100,000 per annum.

Meanwhile Germany was proceeding apace with the construction of a powerful fleet, the menace on the continent was growing. At an Imperial Press Conference held in London in 1909, Lord Roseberry referred to the "bursting out of navies everywhere," and warned his hearers that it was their duty to take back the message to the various quarters of the Empire "that some personal duty and responsibility for national defence rests on every man and citizen." This feeling of uneasiness and insecurity had already found an echo beyond the seas. New Zealand, who had always been prominent for unconditional and whole-hearted support of the Royal Navy, now offered to the Home Government a first class battleship of the latest type and a second if required. Australia, though still holding out for a Commonwealth flotilla and though the Admiralty scheme for this had only just been sent out, was still contributing towards the cost of the Royal Navy in accordance with the naval agreement still in force, followed the example of New Zealand by offering a dreadnought to the Royal Navy.

The importance of naval defence had always been recognized in the southern seas, it had not so far been adequately recognized in Canada. A marked change now occurred. Canada began to realize the importance of assuming a larger measure of responsibility in national defence, and as ever safeguarding Canadian autonomy depre-

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cating the payment of contributions to the Imperial Treasury for naval and military purposes, cordially approved of any necessary expenditure designed to promote the speedy organization of a Canadian naval service in co-operation with and in close relation to the Royal Navy.

In 1909 the self-governing Dominions were invited to send representatives to a special conference in London to discuss confidentially the naval and military defence of the Empire.

The Admiralty in a memorandum circulated as a basis for discussion laid down that if the problem was one of naval strategy the greatest output of strength for a given expenditure would be obtained by the maintenance of a single navy. But strategical considerations alone did not meet the case; varying political and geographical conditions must be taken into account; one Dominion might wish to co-operate in one way, another in another. Thus the creation of separate Dominion fleets was no longer contested, but it was suggested that a Dominion, desirous of creating its own navy, should aim at forming a distinct self-contained fleet unit with a minimum of one armoured cruiser, three light cruisers, six destroyers, and three submarines—in fact, a squadron which in time of war would find a definite place in the whole naval organization of the Empire, and fit into the place with the help of a common standard of training, discipline and efficiency, and of equal facilities for refitting in all parts of the Empire. It was not merely a concession to the views of Canada and Australia, it was the creation of separate units which would combine into one homogeneous whole on a well defined, intelligent, plan.

Australia, New Zealand and Canada settled their plans separately with the Admiralty; South Africa held its hand until the Union was a 'fait accompli'; Newfoundland was content with existing arrangements.

Australia wanted her own navy, New Zealand still adhered to her belief in the single navy. The case was met by constituting a Pacific Fleet of the Empire, consisting of three units, in the East Indies, the China Seas, and Australian waters respectively. The third of these units was to be the Commonwealth squadron. The battle cruiser presented by New Zealand was to be the Flagship of the China station. New Zealand continued her annual contribution of £100,000 to the navy and in peace time some ships from the China station would be allotted to New Zealand waters, manned as far as possible by New Zealanders in order to keep in evidence the direct connection between the Dominion and the Royal Navy.

Canada like Australia had declared in favour of a Dominion fleet, and the Admiralty had contemplated a Canadian fleet unit, like the Australian fleet unit, to be stationed on the Pacific side. The double sea-board of Canada made this arrangement unsuitable in the eyes of Canada, and plans were formulated for a force of unarmoured cruisers and destroyers to be distributed between the two coasts.

The conference was quite as practical on the military as on the naval side. The sub-conference was equivalent to a meeting of the Imperial General Staff. The Prime Minister summed up the result as "a plan for so organizing the forces of the Crown, wherever they are, that while preserving the complete autonomy of each Dominion,

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should the Dominions desire to assist in the defence of the Empire in a real emergency, their forces could be rapidly created into one homogeneous Imperial army."

The decision to create an Australian naval unit was promptly followed up. In 1910 they invited Sir Reginald Henderson, a retired admiral of the Royal Navy, to go out and advise especially as to naval bases and generally as to the Australian naval service and naval requirements. He formulated a bold and spacious policy for Australia—a fleet of 52 vessels, eight of which would be battle cruisers, to be completed in 22 years—the fleet to be divided into an eastern and western division with bases at Sydney and Fremantle—a cadets training college to be established at Sydney, and the Naval Board to be constituted without delay.

As regards Australian military defence, all male citizens between certain ages were made liable to naval or military training. Training as junior cadets was prescribed from 12 to 14, as senior cadets from 14 to 18, and adult training in the Citizen Force (equivalent to Militia and volunteers) from 18 to 20.

Lord Kitchener, after his inspection in Australia early in 1910, had recommended that 80,000 men were required to defend Australia on land, half to protect the larger cities and defended posts, half to be a mobile striking force. He recommended that the Citizen Forces should be organized upon a territorial basis, each area supplying a definite proportion of a fighting unit to be placed in charge of a thoroughly trained instructional officer from the permanent forces. Permanent instructors should be provided by a Staff Corps recruited from the Military College.

Lord Kitchener went on to New Zealand where he urged that New Zealand and Australia should adopt homogeneous military systems in order to be able to efficiently support one another in the event of national danger. The New Zealand Staff Corps should be recruited from cadets sent to and trained at the military college in Australia.

In Canada all the machinery was provided for the creation of a Dominion Fleet but no real progress was made in naval defence. The outlook on land was more hopeful. In 1909 the strength of the permanent force was 2,600. Its principle duty was the instruction of the active militia, which composed of 43,000 more or less trained men formed the main defence force of Canada.

In 1910 Sir John French went out to Canada, at the request of the Dominion Government, to inspect the Canadian Defence Force. The standard of training and efficiency of the permanent force was satisfactory. He did not condemn the volunteer system as being inadequate to the needs of Canada, because it had not yet been given a fair trial; but the organization and training of the militia he considered were both defective.

The organization was defective because :—

(a) The proportion between the various arms of the service was not adjusted.
(b) Military areas were not required each to provide something like a quota of the various arms.
(c) Peace organization had not been assimilated to the organization which would be required in war.

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Training was defective because :—

(a) Military knowledge in the higher command was inadequate.
(b) Test qualifications for Officers and N.C.O's in the active militia were not strictly enforced.
(c) The rank and file were not compelled to fulfil their engagements.

What was wanted was a sound peace organization and a thoroughly well established staff system in order to ensure rapid mobilization and prompt movement which alone could secure to Canada the initiative in a serious war.

It must be remembered that into Canada there was a rapidly growing influx of immigrants; new areas were being opened up; movement was everywhere, and the conditions were such that it was far more difficult to create and maintain a uniform system than in a matured community. What nature dictated to the overseas Dominions was growth, development, commercial, agricultural, and industrial enterprise, rather than discipline or system. The wonder is not that so little was done, but that so much was done; and much was done.

The results of overseas defence up to the end of 1910 were—Australia had settled and was working at its naval and military programme. Canada had in a half-hearted way recognised the need for naval defence, but had made great progress with defence on land.

South Africa had accomplished its Union, a necessary preliminary to a national system of defence—Kitchener had recast the military organization of India—Two Inspector Generals were appointed, one for the Home and the other for the Overseas Forces.

Most important of all, the Imperial General Staff had come to stay.

The Imperial conference met again in 1911. South Africa was represented for the first time as a single unit by General Botha. It was agreed that naval and military matters should be relegated to the Committee of Imperial Defence. The proceedings of this Committee opened with a statement by the Foreign Secretary who explained the international policy at the time. *This was the beginning of taking the Dominions into partnership with regard to the foreign relations of the Empire, and was a natural issue since defence was recognized as involving Foreign Policy and the Dominions had recognized that defence was a matter of common concern.* As regards naval defence it was laid down that the training and discipline of the naval forces of the Dominions should be generally uniform with that of the Royal Navy, that Officers and men of the respective forces should be interchangeable, and that in time of war when the naval service of a Dominion had been placed by the Dominion Government at the disposal of the Imperial Government, the ships should form an integral part of the British fleet, and remain under the control of the Admiralty for the continuance of the war.

Uniformity in military education and training was growing. The Dominions were adopting the same examinations for the promotion of officers as were laid down for the British regular army, courses of instruction at home and in India were started for Dominion officers which included courses at Camberley and Quetta.

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The change of Government in Canada in 1911 marked an important change in Imperial Policy. Sir Wilfrid Laurier's policy had been to keep Canada out of the vortex of Imperial militarism, vigilantly and almost suspiciously to safeguard her self-governing rights. When Sir Robert Borden become Prime Minister all this was changed. He realised that by taking a more active and leading part in defence of the Empire, Canada would attain what was still wanting to complete her status as a nation, her full and rightful share in the control of the foreign policy of the Empire. The proceedings of the Canadian Government in naval matters had hitherto been in strong contrast to the energy and zeal shown by Australia and New Zealand. Meanwhile, in 1912, the German navy was being expanded in strength and efficiency; it was patent that a grave and imminent danger to British sea-power had grown up in the North Sea. An understanding was arrived at with Canada based upon closer partnership and upon increased effort by Canada. The Malay States in 1912 offered a first class battleship to the Home Government. Meanwhile, Sir Robert Borden proposed that three modern battleships should be constructed immediately, and that they should be placed at the disposal of the Crown for the common defence of the Empire. The great need of the Empire was an answer to the German menace by an immediate increase of British naval strength. The Canadian ships would for the time be an integral part of the Royal Navy, without prejudice to their reversion to the control of the Canadian Government should it be ultimately decided to create a Canadian naval unit. Borden's proposal was one to meet an emergency, it was not intended to be the beginning of a series of periodical contributions. His scheme met with violent opposition from Sir Wilfred Laurier and his followers. Laurier contended for a permanent policy of naval defence on the part of Canada by ships constructed, armed, and manned by Canada. The bill was defeated in 1913, and during the fourteen months prior to the war no further definite step was taken.

The battle cruiser "New Zealand" was under the arrangement of 1909 to have been the flagship of the China station, but as German naval pressure increased the New Zealand Government agreed that she should take her place in European waters where alone she would meet her equals. The Admiralty had been unable to station in New Zealand waters ships of as heavy a type as had been promised, and in 1913 New Zealand, not so much by her own desire as by the force of circumstances, decided to initiate a Dominion Naval Service. The Dominion still closely adhered to the doctrine of the single navy, and the new law provided for placing everything, forces and ships alike, at the disposal of the Government of Great Britain in the event of war or imminence of war, and service in the New Zealand naval forces included service without, as well as within, the limits of New Zealand.

Australia was pressing forward, steadily, the construction of her naval unit. By the end of 1913 the fleet included a battle-cruiser, two light cruisers and a third being built, besides destroyers and submarines. The Australian naval agreement with the money contribution had been finally cancelled, and the Australian naval service had become a reality with every prospect of growth.

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But for the war there would have been need again to revise the terms of naval partnership. The German menace tended more and more to dominate the naval outlook in England, perpetually reinforcing the argument for concentrated strength and a single navy. The Admiralty outlined a policy which would combine sound military principle with local aspirations. It was a policy of maintaining an Imperial squadron to which the Dominions would contribute their heavy ships, which would be mobile, which would find in Canadian, Australian or South African waters bases and docks, enabling it, in time of emergency, to operate in any of these waters for a long time together, and which would on each station be supplemented by local defence flotillas and light cruisers built for the protection of trade.

The war put an end to divergence of view, but the problem is interesting how to find the greatest common measure of naval and military effectiveness and yet not to run counter to the sense of national ownership in sea and land forces, in men, guns and ships which is not and never will be satisfied with owning them at a distance from their own lands and seas.

The Union of South Africa had not, by the date when the war began, devoloped any definite policy of naval defence. The annual contribution given by the Cape and Natal to the Royal Navy were continued after the Union had come into being. General Botha, in 1913, was authorized by the Union House of Assembly to take counsel with the Imperial Government as to what provision should be made for naval defence. The South African Defence Act of 1912 laid down the lines of the future military system of South Africa. The Union at that date was the only one of the self-governing Dominions that still had an Imperial garrison within its borders. This Act made all male citizens between the ages of 17 and 60 liable for service in time of war, and between the ages of 17 and 25 in time of peace. The Defence Forces were divided into five categories: the permanent force, the coast garrison force, the citizen force, the royal naval volunteer reserve, and any special reserve establishment under the Act.

The military policy of the four colonies formed the nucleus of the permanent force which was to include five or more regiments of the South African Mounted Riflemen, the first of which was the famous Capt Mounted Rifles. The main defence force was, and is, the citizen force consisting of the active citizen force, the citizen force reserve and the national reserve. The active citizen force combined with the permanent force was to be the first line of defence.

It was held to be unnecessary to train the whole population; all however were to be registered and if in any military district the number presenting themselves for training fell short the deficiency was to be made good by ballot. Those citizens who were liable to, but were not called up for military training, were to become members of rifle associations. The citizen force was still in process of creation when the war broke out.

In Australasia and Canada in the interval between the Imperial Conference of 1911 and the war, less change took place in their land forces than in their naval forces. Australia had adopted compulsory training, Canada had not.

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The development of the Imperial General Staff was maintained and extended. The training of boy cadets made conspicuous progress. Australia had in 1911 opened the military college at Duntroon; admission was by open competition, some 30 cadets between the ages of 16 and 19 being admitted annually.[1] From this College would come the commissioned officers of the permanent force, who would instruct Officers and N.C.O's of the citizen army.

In 1914 Sir Ian Hamilton, Inspector General of the Overseas Forces, visited Australia and New Zealand. He urged the necessity for eliminating in matters of organization, the distinction between peace and war conditions; for decentralizing and relieving the military commanders from the purely business work incidental to an army. He found in the Australian land forces the defects inherent in every militia, want of practical experience in the field and of habits of discipline. The whole of the regular and three-fourths of the actual serving militia were sufficiently trained to take part in a modern battle.

New Zealand differed from Australia in having her militia forces controlled, subject to the authority of the Minister of Defence, by a single officer—General Godley—not by a Board.

Sir Ian Hamilton found a growing citizen army in the linked stages of senior cadets, territorial force, and territorial force reserve, with the supplement of rifle clubs. The cadet system was excellent, but he recommended that cadet units should be more closely linked to the territorial force by affiliating them to particular territorial units. The force suffered from want of field work and habit of discipline.

In Canada all citizens between the ages of 18 and 60 were legally liable to service in the militia, but there was no machinery for enforcing the liability. The problem of the defence forces of Canada was more difficult. The rapid development of the Dominion brought abundance of civil employment at high pay, with the inevitable consequence of depreciating military service, and making it difficult to maintain the small permanent force upon which the active militia depended for instruction.

Sir Percy Lake, in his report as Inspector General in 1910, had held that the best hope for future efficiency lay in the success of the cadet movement. In 1911, in accordance with Sir John French's recommendation, a new scheme was adopted whereby the organization of the militia was made the same in peace as in war, six divisions being formed with four cavalry brigades, and each division being placed under a commander with a divisional staff. But there was still a shortage of officers, lack of qualifications in Officers and N.C.O's, and difficulty in keeping the permanent units up to strength. On the other hand the cadet movement, in which Colonel Sam Hughes as Minister of Militia took great interest, went forward by leaps and bounds. Sir Ian Hamilton went to Canada in 1913. He had always been in favour of the voluntary system, and reported that boy training might

[1] The Establishment of the College until recently allowed for the admission of 30 Australians and 5 New Zealand Cadets annually, but the intake has now been reduced to 15 cadets in all. The normal course lasts 4 years. (Notes on the Land Forces of British Dominions, &c. 31st December, 1922).

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well become so general as to be a partial substitute for universal manhood training, but were the cadet movement to stagnate, then Canada should follow the example of other Dominions, and adopt compulsory military training up to the age of 18. He advised that, without going further in the direction of enforcing the liability, a register of all able-bodied citizens should be kept, and that on this register should be based the schemes for home defence. Sir Ian Hamilton recommended raising the peace establishment of existing units, and he commented strongly upon the total absence of reserve stores for war. He recommended the formation of a national reserve in addition to the nominal reserve militia, composed as in England of men who had served in the permanent forces; and also the amendment of the Law in order to enable the Canadian defence forces to volunteer for service overseas.

Such were the military forces of the self-governing Dominions when the war came. It caught them in their infancy, not yet co-ordinated with the armies of the Mother Country, of India, or of each other. It caught them half-organized, less than half-trained; the training had to be completed on the sands of Egypt or in the mud of Salisbury Plain. It taught, however, that citizen forces are in the last resort the one and only sure guarantee of democracy and freedom, and it cut short the fatuous platitudes of those who confused provision for security with militarism.

In 1914, Australia led the Dominions in the measure of support in ships and personnel which she afforded. Her navy consisted of :—

1 Battle cruiser.
3 Protected cruisers.
6 Destroyers.
3 Submarines.

Immediately on the outbreak of war the Government of the Commonwealth placed the Australian ships unreservedly at the disposal of the Admiralty. Additions to the Navy were made and by the end of the war its size had been doubled.

After the war it was a formidable burden for a population of $5\frac{1}{2}$ millions to support, and it is not surprising that vigorous retrenchment was demanded and carried out. The Australian navy in the present day consists of :—

3 Light cruisers.
3 Destroyers.
1 Sloop.
5 Auxiliaries and depôt ships.

If Canada's greatness extends across a continent from the shores of one ocean to another, it is for that reason a greatness which entails a double burden of defence, a burden which is seriously weighing on the minds of her leaders. For the present she is putting her entire trust in the Royal Navy. The war found Canada without anything in the shape of a navy, yet Canadians did fine service on the seas and over twelve thousand volunteers were drafted into the Royal Navy. The Canadian Minister for Defence in 1922, explained the present policy when he said "We cannot afford to build or maintain

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ships which may be obsolete in a year or two, therefore we are going to try to concentrate on training the men instead."

New Zealand, realizing that it would be grossly unfair and unpatriotic for the Dominions to permit the taxpayers of the United Kingdom to contribute in the present proportion, proposed to increase the naval expenditure from £400,000 to £500,000. Apart from the financial subsidy, New Zealand's contribution towards Imperial Naval Defence consists of the maintenance of a training ship and active recruiting for the cruiser presented to her by the British Government in 1920.

The Naval Defence Report, which has been presented to Parliament, states that the foundations have been laid for the expansion of the sea-going squadron, as the financial position improves, to three light cruisers, an oil tanker, and a submarine unit. New Zealand's share of the cost of the naval base at Singapore, estimated at £200,000, will be discharged in two years, when, it is hoped, additional money will be available for the maintenance of the larger squadron.

Oil reserves are being established at Auckland. Provision is also being made, in accordance with Admiralty suggestions, for equipment bases with provision stores and guns for merchantmen, and for mobile defence. (Wellington, N.Z. 16.8.23).

As for South Africa, the Union paid a small annual subsidy until 1922 towards the maintenance of the British navy, but this subsidy has now been withdrawn, and the only South African reinforcement to the Royal Navy on the huge South African Station is one surveying vessel and two mine sweepers.

Such is the present situation and it scarcely can be said that the Dominions are within sight of providing their own naval defence.

This article is published by kind permission of Sir Charles Lucas, the greater part of it being extracts from his book "The Empire at War," a précis of articles which have appeared in "The Times" being added to it.

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LIEUT.-GENERAL SIR LAWRENCE WORTHINGTON PARSONS, K.C.B.

Colonel Commandant, Royal Artillery.

Born 23rd March, 1850. Died 20th August, 1923.

AN APPRECIATION.

THE announcement of the death of 'Larry' Parsons, as he was affectionately termed by his intimates, came as a shock to his hosts of friends in the Regiment, in which his entire service of 53 years had been spent, for he appeared to have retained—practically up to the last—and in a marked degree, that alert, soldier-like and happy native-born personality, which was so characteristic of him and which endeared him to all who came in contact with him, either professionally or in private life.

An ardent and capable soldier and keen sportsman, he was eminently qualified for the high appointments he held with such credit to himself and advantage to the service.

He was the only son of Lawrence Parsons, Esq., of Parsonstown, King's County, a scion of the family of the Earls of Rosse, and was educated at Cheltenham college, the present writer having been associated with him in Boyce's house. He left the college for private tuition, prior to entering the Royal Military Academy in August 1868, whence he obtained his commission as Lieut R.A. in July, 1870. He served in the Field artillery at Weedon and Aldershot in the 24th Brigade, and, for three years, in India in 'A' Brigade R.H.A., being promoted captain in 1880.

In 1881 he began a spell of five years home service as Adjutant of the 1st Sussex Artillery Volunteers, and on promotion to major was quartered in Jamaica 1886—1890.

On return home he was posted to the 67th Field Battery at Fermoy, became Lt.-Col. in 1896, and remained in Ireland at Athlone and Cahir till 1899.

On the outbreak of the South African war Parsons got his first chance of active service, and was sent out to Natal in command of the 5th Bde.-Divn. Field Artillery consisting of the 63rd, 64th, and 73rd Batteries. Once arrived at the seat of war, November, 1899, he was not long 'ere he came to the notice of Genl. Sir Redvers Buller and was with him through all the "black" days and vicissitudes prior to the relief of Ladysmith, thus becoming early acquainted with the hardships of campaigning under peculiarly strenuous and often disheartening conditions.

It is common knowledge that he bore himself during those four months in a manner which brought nothing but approbation from his

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gallant but sorely harassed chief who thought so highly of him that he invariably selected him to command his artillery whenever he could do so.

After the disaster at Colenso on 15th December 1899, Parsons with two of his batteries supported and did his utmost to cover General Hart's gallantly rash, but fruitless, attack on the left of the Boer position, and in so doing came under a very troublesome fire from the Boer heavy artillery which put one of his guns out of action and caused several casualties. His guns also helped to cover the subsequent general retirement of Buller's army.

He next took part in the operations of this force between 17th and 24th January 1900, including the fighting round Spion Kop and the withdrawal across the Tugela, and we find him mentioned by name as C.R.A. in Sir Redvers' detailed orders of February 3rd for the attack on Val Krantz which was captured on February 5th, but evacuated on the 7th, after which Buller retired his force to Chieveley.

Parsons who had taken his full share in the trying operations about Val Krantz, remained with his chief in command of the artillery, which, according to the "Times History," was now a considerable, if heterogeneous, force of some 76 guns made up of Naval 4·7″ and 12-prs.; R.G.A. 4·5″; 61st Batty. howitzers; the Chestnut troop, R.H.A.; six field batteries and the 4th Mountain battery.

He next took part in the operations of the 14th to 27th February, on which day Buller's carefully laid plans and preparations culminated in the victory of Pieters Hill—occurring, by a happy augury, on the same day as the surrender of Cronje at Paardeberg, the news of which greatly cheered Buller's troops as must the news of Pieters Hill have cheered Lord Roberts! In the words of the "Times History":—

"Colonel Parsons' dispositions for the Artillery were admirable . . . . and contributed in no small measure to the result . . . . The night of the 27th put an end to the long and strenuous resistance of the Boers on the Tugela." The success of this battle in which the greatest gallantry was displayed and which lasted six hours, costing some 500 casualties, was chiefly due "to the attempt . . . . to work at least half the troops and all the guns in combination; the result was instantaneous, overwhelming and comparatively easily obtained."

On 28th February, Lord Dundonald and his cavalry entered Ladysmith which had held out for 118 days, and on the 3rd of March the relieving army made its formal entry.

With this satisfactory ending to a troublous period of some five months, Parsons' purely regimental service came to an end, and we find him on 23rd April, 1900, in the proud position of Colonel on the staff commanding the artillery in Natal, which important post he held until January, 1901, having attained to the rank of substantive colonel on the 23rd October, 1900.

Buller's army now (according to the "Times History") amounted to some 55,000 men, and after a somewhat lengthy rest in camp round and about Ladysmith, Lord Roberts on 2nd May, 1900,

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directed Buller to occupy the Biggarsberg, then strongly held by the enemy. Accordingly on the 12th, Clery's division with Dundonald's mounted brigade and other details, and a strong force of artillery under Parsons left by the Helpmakaar road—the route which the Boers least expected them to take—and the enemy, taken by surprise was, after a sharp action, driven out of Helpmakaar and retreated on Dundee—followed up by Clery and Dundonald—which place as well as Glencoe were occupied by Buller on May 16th.

Desultory operations followed, in all of which the artillery took their full share. On June 8th, Botha's Pass was captured and by a well executed flank march through the Free State and Transvaal, Buller came up with and overtook the enemy at Alleman's Nek, the artillery coöperating admirably with the infantry, resulting in the British reaching a position in rear of the Boer main body on Laings Nek. Failing to pursue, however, the wily Boers got clear away in the night with their guns, leaving the British in possession of the Nek.

These last operations were well planned and carried out. Parsons remained with Buller who on 4th July, 1900, joined hands with Lord Roberts at Vlakfontein.

Colonel Parsons was next concerned in the operations in the Transvaal to the east of Pretoria and in Natal, lasting up to November, 1900, and including the actions at Belfast on August 24th, and 26th and Lydenburg, September 5th to 8th.

The present writer has had the advantage of hearing from more than one of those who were privileged to be in almost daily touch with Colonel Parsons during the operations in Natal, 1899—1900.

One brother officer in particular writes as follows:

"Any account of the part played by Lawrence Parsons in the operations of General Buller's army would be inadequate to his memory which failed to emphasize that wonderful personality which influenced others all through his life and proved to be of such immense value not only to the conduct of the campaign but to all ranks, seniors and juniors, who came in contact with him during those anxious days. He inspired confidence and routed any tendency to despondency by his cheery optimism, practical common sense, soundness of his opinions modestly given, and sympathetic consideration for the views of others. He was always ready to take on himself the responsibility for the sins of his subordinates, but he could be angry on occasions:—*e.g.* A battery commander who impaired a prearranged plan by seizing a rare opportunity for watering his horses, heard more about it later! On the other hand another B.C. who by strenuous exertions reached the camping ground and pitched camp before the staff had allotted sites, was successfully supported by Parsons when the delinquent demurred to picking up all his horselines! Again in a case of supposed disobedience where a certain unit which, being on the high seas, never received an order issued by Lord Kitchener, and that rigid disciplinarian inflicted a severe reprimand which was to be recorded against the commanding officer on the ground that ignorance of orders is no excuse, Parsons took the entire

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blame on himself, representing that it was he who should have communicated the order to the unit on its disembarkation, and in consequence, long after the event, the black mark was obliterated!

Parsons was essentially a man of broad mind and of rare loyalty, and would do all he could to carry out the wishes of his chief without a thought about himself.

It was always the same with him; get down to the bed-rock of common-sense, reinforced by practical experiment if necessary. Whether the question was one of the employment and technical gunnery of the naval guns, or the relative advantages of horses four abreast, or the merits of fire from behind cover, or even on matters about which he never pretended that he knew more than he really did, Parsons' opinion was worth having and was eagerly asked for.

He was a good disciplinarian but would maintain that regulations were not necessarily of the Medes and Persian type, and hated what he called 'the Sergeant-major's click of the heels'!

Other reminiscences occur to one to illustrate his many attributes, but it is perhaps the merry, good humoured twinkle in his eyes which will live longest in the memory and hearts of his many friends, one of whom—his Irish ex-soldier servant—was the last to see it, just before Lawrence Parsons sank back on his pillow and passed away."

Another, a Staff officer of high rank, writes :—

"I was brought much into contact with Parsons; Sir Redvers Buller had the highest opinion of him, and this opinion was shared by the whole of the staff. He commanded the artillery, which, as you say, was a somewhat heterogeneous force, with marked ability, and I think that there were comparatively few who understood the working of the guns with the infantry as he did.

Parsons was a great help to us all and his opinion had much weight. Sir Redvers knew his value and he was held in high regard. He had as his Staff officer Capt. R. M. Boger,[1] R.A., a most excellent staff officer who had many of Parsons' qualities, and both were most popular with everyone."

Parsons' service in South Africa was now (Nov. 1900) closed and he returned to England, having been given the appointment of Colonel on the staff, C.R.A. on Salisbury plain, was created a C.B., and received the S.A. Queen's Medal with six clasps and three mentions in despatches in the *London Gazette*.

Having taken up his new work at Salisbury straight from the seat of war, and with his valuable first-hand experience of the methods and tactics of artillery in the field it can be readily understood that Parsons' arrival at this important school of artillery was most opportune and tended entirely to revive and bring up-to-date the syllabus of instruction.

[1] Alas! Capt. Boger who followed his chief to Salisbury and was, later, as Bt. Lieut.-Col., Military Attaché in Japan, died in Tokio in 1910, to the great sorrow of everyone that knew him. Had he been spared he was bound to have made his mark in the service of his country.

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The present writer was therefore not surprised to read in a letter from a senior R.A. staff officer to whom he had referred some question in connection with Sir L. Parsons' evidence before a W.O. committee :—

"Anyone who, like myself, had the good fortune to have served under him after the S.A. war, when he was on Salisbury plain, will remember his bright and arresting way in bringing out the lessons of the war we had just come through and will realise that he would have presented his views in just the same picturesque and clear-cut fashion."

Parsons held this appointment until the 29th January, 1903, when he went on half-pay. It was not, however, to be expected that an officer with his record would be allowed to remain idle, and, a bare month later we find him—on 20th February, 1903,—promoted Major-General to take up the coveted post of Inspector General of Artillery in India.

An officer intimately connected with him during his period of service in this appointment writes as follows :—

"He had an intolerance of 'red-tape' in every shape and form, and not infrequently, when criticising the manner in which a battery commander engaged his target at practice camp, he sometimes got as reply 'because it is not laid down in the 'Field Artillery Drill' Sir' to which the I.G.A. would invariably rap out 'Is there anything in the book to say you are not to do it?'

The improvement in the shooting of batteries of all natures during his four years tenure of his appointment, was remarkable, and though his insistence that mountain batteries should not invariably do their annual training in the mountains, but occasionally join their brethren of the R.F.A. in the Hutti and other practice camps may have been criticized at the time, it turned out to be an instance of his wise foresight as to the future *rôle* of pack artillery, which at the present time is so much to the forefront.

As an inspecting officer who always spoke out frankly what was in his mind, he might easily have been unpopular with some of those who came in for his criticisms, but it can safely be said that he made very few, if any, enemies, and that all ranks were genuinely pleased when he visited their practice camps. Perhaps the reason is not far to seek; he was equally generous of his praise for good work as in condemnation of the reverse.

Possibly I may be considered a partial witness for I find myself quite unable to express my immense admiration and affection for my lamented chief with whom I travelled many thousands of miles in the comparative discomfort of an Indian railway train, and I never experienced anything but the greatest courtesy and consideration from him, and not even did the constant click of my Blick type-writer elicit a murmur from him!

I honestly believe that he did quite as much—if not more—for the R.A. in India as any of his distinguished predecessors in the appointment."

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On return from India, Parsons went straight to the command of the 8th (late 6th) Infantry division at Cork, which he held until he was promoted Lieut.-Genl. on 8th May, 1909, and on 8th August, 1912, was placed on retired pay having been made a K.C.B. on the occasion of the King's birthday—14th June. He had, so far back as 1904, been awarded the Good service pension.

On his retirement he went to reside at Cirencester and soon became a well-known figure in the hunting field, being a fine horseman and keen rider to hounds all his life. No doubt his early bringing up in Ireland and his experience when stationed at Weedon in his first soldiering days whetted his appetite for the "sport of kings."

When Lord Byng's committee on the subject of a possible re-amalgamation of the Royal Regiment of Artillery was sitting at the War office some years since, Sir L. Parsons was called in as a witness, and the present writer who occasionally met him at the "Rag" and discussed this all-important question could not but be impressed with his common-sense views. His evidence unfortunately has not been preserved.

On the declaration of war in 1914, Parsons was detailed to purchase horses for the government in Gloucestershire, and in the autumn of 1915, was selected to train the 16th Division (South Irish) of the new army. His careful organization and training of this division—although, to his great regret, he was on account of his seniority, deprived of the satisfaction of taking it to France—was rewarded by the fact that it greatly distinguished itself in the war.

In March, 1917, he became Colonel commandant R.A., and in 1919, he finally settled in Reigate where he started an ex-soldiers club and took on many local activities into all of which he entered whole-heartedly with his usual energy.

When on Salisbury plain, where he was responsible for the training of the Horse and Field artillery in gunnery, tactics, etc., he wrote a pamphlet for the R.A. Institution of great educational value, entitled "Hints on training the intelligence and powers of observation of officers, n.c.o's and men," which had a ready sale at the modest price of 6d., and is still in request. When first published he had letters from officers of every branch of the service acknowledging the great help they had found it.

Since the lamented death of Sir Lawrence Parsons, letters have been received by his family from many of those who had served under him in the 6th and 16th divisions, stating how much they owed to him and profited by his training, also how devoted all ranks were to him.

Sir Lawrence Parsons was the selected representative Colonel commandant R.A. for 1923, and no one could have been better qualified for this high honour.

The funeral took place with military honours at Reigate on 23rd August, the body being borne to the grave on a gun carriage supplied by the 1st Training battery, R.A. Depôt, the coffin being covered with the Union Jack and bearing the deceased Officer's sword and cocked hat and a wreath from the Reigate " British ex-service men's club."

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Four Colonels commandant R.A. acted as Pall-bearers, viz :—

Major-General Sir Desmond O'Callaghan.
General Sir Henry C. Sclater.
General Sir George Milne.
Lieut.-General Sir A. Hamilton Gordon.

The service was taken in the Church by the Vicar of St. Mark's, Reigate, and the Revd. Nevill Robertson, brother of Mr. Manning Robertson, son-in-law of Sir Lawrence Parsons. In addition to the family mourners there was a large attendance of neighbours and of representatives of the various local associations with which Sir Lawrence was connected. His Majesty the King was represented by Colonel G. W. St. G. Grogan, VC., and besides the Pall-bearers there were present several Officers of the R.A. including Brig.-Genl. H. A. Bethell, Colonels H. E. Vallentin, R. M. Johnson, W. H. Kaye, Brig.-Genl. Soady, I.A., &c.

Many old comrades wrote regretting inability to attend.

A Guard of honour of the 5th Queen's Cadets followed the gun carriage from the church to the Reigate cemetery. The R.A. found the firing party, and the R.A. trumpeters sounded the "Last Post". Many beautiful wreaths were sent and the greatest sympathy was evinced. Sir Lawrence leaves a widow and one daughter.

J.C.D.

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DUNCAN ESSAY, 1922-23.

Subject to be chosen by competitor, but it must be a serious discussion of some up-to-date question connected with R.H. and R.F.A., or it may be a tactical or technical Field Artillery study based on lessons of the Great War.

THE CONTINUOUS SUPPORT OF THE INFANTRY IN THE MOVING BATTLE.

BY MAJOR A. H. BURNE, D.S.O., R.F.A.

"Cum vulpibus vulpinandum."

(Recommended for publication).

"IN dealing with foxes we must be foxey," i.e., "Suit your methods to the adversary." Who is our adversary? Prudence dictates that we should assume him to be the strongest possible adversary. Therefore we should incorporate prominently in our post-war training the lessons to be learnt from the moving warfare operations on the Western front. The following pages are written from this point of view. No apology is offered for devoting the opening portion of this essay to stressing the importance of regimental officers studying the problem of which it treats, and to emphasizing the difficulties which that problem presents.

To make good this point we must begin by considering the general principles which govern the action of artillery. This need not detain us long. They are clearly, even minutely, laid down in our Training Manuals and no one disputes them. They may be summarised in a few words.

We are a subsidiary arm. We act at such a time and in such a manner as best to assist our infantry to attain their objective, or to make good their withdrawal. To effect this, we must maintain with them the closest possible contact, mental, personal, and visual. We must appreciate their point of view, realise their difficulties, anticipate if possible their needs, and be ready to give the appropriate support at the appropriate moment.

Now our ruling difficulty is that the best place from which to ascertain what support is appropriate, and the best place from which to apply it are generally far removed. This difficulty is obviated in trench warfare battle by the higher command pre-ordaining the battle and its course. But, it may be said, "It takes two to make a fight." Does it? Not in trench warfare; if one side ordains a battle, a battle there will be. Herein lies the basic difference between trench and open warfare; whence it follows that open warfare is at once the more difficult and more fascinating of the two.

If this is true of the other arms, how pre-eminently is it true of the artillery: consider the situation. The trenches are passed, and

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no longer are we gunners the muscles actuated by the brain of the higher command, responsive to its thoughts, and registering its decrees. Now the firing line claims a share in that brain—a claim that becomes ever more insistent as the battle line becomes more and more fluid. With possibly conflicting objectives, and with divided allegiance, a third claimant then arises for its share in the brain; namely, the artillery itself.

In other words, the mantle of initiative falls upon the artillery commander, involving freedom of choice, of movement, of method, and of time. Now must he think for himself, and act for himself, in the ever changing situations and problems that will face him. If trench warfare be likened to a game of chess (becoming ever more scientific and exact) when the enemy is visibly before your eyes, open warfare may be likened to a game of poker where the enemy's strength and dispositions are hidden, and to gamble on probabilities is not only legitimate but necessary. It follows that the future course of action of units in the fight cannot be prescribed or foreseen. Decisions must be come to on the spur of the moment, almost on the impulse of the moment; hence authority or "command," must be radically decentralised. This principle applies to artillery almost as much as to infantry. Though a portion of the artillery is retained in the control of the C.R.A., the normal work of continuous support is assigned to decentralised units, and these units normally are batteries, sections, and even single guns.

Again, in static warfare situations can be foreseen, methods can be standardised, procedure can be learnt "from the book"; mathematical precision can almost be obtained.

But moving warfare is "cut in a different mould." Here a commander must think and act for himself, with possibly only experience and his own wits to guide him.

It must be remembered that a campaign opens and generally closes with moving warfare. This it is which brings the decision, which waits not while a man trains himself for it. The first few swiftly moving weeks—days even—may cast a permanent complexion upon the remainder of the campaign, those first few days when the battle takes one as it finds one, and which admits of no "training on mobilization."

Therefore it is to moving warfare that we should devote the bulk of our attention, training, and time; and it is on the most essential yet most difficult section of it that gunners should concentrate, namely, "The continuous support of the infantry in the moving battle."

We have seen that *experience* and *wits* will be our standby when the decisive moment comes. But how can an officer fare who has no past experience of active service? How else than by studying the campaigns of his predecessors? Now, at present, such an officer is confronted by a difficulty. In spite of the immense out-put of war literature, there is singularly little yet published of the sort of details he requires. Such things for example as the movement of the guns at the battle of Messines, October 31st, or the methods of communication between O. P. and battery on November 11th, 1914, or how the advance of the artillery was conducted after the final battle of the

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war at Catillon, November 4th, 1918. It would be instructive also to know how much information and how many orders were received *from the rear* on these and like occasions. Hence it is to be hoped, in the interest of the rising generation of officers, that this information will soon be forthcoming.

And now we come to the closer study of the problem. The general principles have not done much to help us, except to point out the essence of the problem to be solved.

There is here no "royal road to success," any more than there ever has been in war. Napoleon's most brilliant victories were gained, not by inspiration, but by intense application and thought, and the most careful working out of details—he admitted as much himself. It might almost be said that his amazing campaign of Ulm, was won on a pair of dividers.

So too in our case, all that can be done is to descend to details, not despising them, but realizing that the cumulative effect of them may be to win a victory or stave off a defeat.

Thus, though the following details may seem comparatively trivial in themselves yet if viewed in the light of what has gone before, their inclusion may appear justified. It will be observed that they do not deal with the situation which may arise when the artillery of both sides is mechanicalised, and when aeroplanes and tanks will have gone far to wrest from the foot soldier his proud title of "the battle winner." Till the present experiments in mechanicalisation are concluded it would be idle to speculate on this subject. It would be folly to abandon our study of the problem which at present confronts us because of the probability that it will some day be changed. All reference to such matters has, therefore, designedly been excluded from this paper.

We can now get down to the details. It is obvious, at the outset, that as our infantry move forward a single artillery fire unit cannot possibly give them continuous support, because the guns must move also, and cannot fire on the move. Hence units must "leap-frog" forward in order that this "continuous support" may be available. By "continuous support," it should be explained, continuous *potential* support is implied. There should always be some guns in a position of observation or readiness, if not actually engaged. The system of command must admit of this continuous potential support on the move.

The French had an elaborate system of "temporary grouping" guns to infantry units, which was godfathered by General Percin, and practised by him (though with singularly little success) in the Picardy manœuvres of 1910. By this doctrine it practically meant that every time a battery changed its target, it came under a different commander. Naturally enough, little was heard of this curious doctrine during the war. It pre-supposes that information and orders will come from the rear—*liaison en haut*—whereas in moving warfare it usually comes by *liaison en bas*, from smaller units in front (including let us hope, aeroplanes) or by *liaison à vue*, by direct observation from the O.P. Hence the importance of decentralised command.

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As the firing line directs the combat, all information should go direct from it to its supporting artillery; not to divisional headquarters. The London Scottish on their first night in action observed this principle, by sending back a runner to tell "the big guns in rear" that the enemy had broken through. Through the artillery the cavalry higher command was soon informed. Artillery is the mortar which binds together the bricks on the battlefield, not only the bricks alongside one another (two neighbouring companies or battalions) but the top row (firing line) with the next row (brigade headquarters).

The same principle may be applied to low-flying aeroplanes. If they can be induced to drop short messages on to the guns as they fly back from the hostile lines, such as "*Enemy in L 26.*" "*S.O.S. Jeancourt,*" "*Our troops entering Ham,*" tremendous help is given to the gunners. For some reason they do not seem to like doing so and divisional headquarters are probably chiefly concerned with getting the information quickly and direct. No doubt they argue "we can circulate the news to all concerned." But one would ask the higher command, how often did they ever succeed in getting information forward to batteries *in time to be of use* in any phase of our moving warfare in the late war?

On the other hand the guns tended to become the natural focus for information. They proclaimed their presence by their noise. Stray infantry runners were attracted towards them, staff officers enjoyed the view from their O.P's., and generally there was some handy means by which they could pass expeditiously to the rear any information received. If telephone was not laid and visual signalling was impossible, a mounted gunner would gallop back with the news. The absence of horses for infantrymen evidently proved a big handicap to them on many an occasion.

We must now consider an all important question, namely the selection of the O.P. It has already been pointed out that in the moving fight the dominant difficulty is to find some spot from which both to view the fight and to control the guns. Unless this spot can be found, action cannot be co-ordinated and synchronized with the infantry. Yet *everything* depends on this synchronization. The French military critic Allehaut, puts it aptly "Le problème de la bataille réside dans la réalisation de ce synchronizme et dans son maintien de bout en bout du combat." Now it is recognized that elaborate timed *schemes* are out of the question in a rapidly moving fight. If the *watch* is ruled out there only remains the *eye* with which to effect this synchronization. The problem broadly stated, is to lift our fire before it endangers or discourages the infantry in their advance, while at the same time to delay this lift till the last possible moment. In other words *we must be able to see at least 200 yards this side of the nearest spot on which we are pitching, or going to pitch our shells during the infantry advance.* If we cannot do this (still ruling out the watch), our fire may be worse than useless. Unless and until we can do this we should confine our fire to spots far beyond the enemy's advanced troops.

If all wars were conducted on terrain similar to Salisbury Plain, it would be fairly easy to maintain this *liaison à vue*, without going very far from the battery.

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But in practice it is seldom possible to see the zone between the two armies from near the battery. As often as not this can only be done from quite near our front line. Now if a line is run out to an O.P. at this spot, say 1500 yards to 2000 yards in front of the battery,

(a) By the time communication is established the situation may have radically changed, our infantry may be over the next crest and out of sight.

(b) The line may be cut by shell and the battery completely muzzled.

(c) A hurried move may entail scrapping the cable which has been laid, which is a serious matter in moving warfare.

Hence the first desideratum seems to be to establish a possibly second rate O.P. quite near the battery in the first instance. If only quite a small strip of hostile country can be seen, it is at least something to check lines and register by; and with the help of the map, valleys can then be searched, woods swept, or cross roads kept under fire at a safe distance behind the enemy's lines. So first of all, get this O.P. established, and when this is done (or even simultaneously, if another officer can be spared), start reconnoitring for another O.P. further forward. If, when this is accomplished, the situation has not altered materially, start extending the line to the new O.P.; and, that done, reconnoitre still further forward for a third O.P. This procedure has the advantage of overcoming the above mentioned objections (a), (b) and (c), and by it, if the line does stabilise, a forward O.P. will soon be established.

The objection to it is, that it is a difficult thing to do, because it disorganizes the battery staff and requires a lot of signallers. To be candid, the present organization of signallers into "A" and "B" groups is not adapted to this sort of situation; yet it may almost be considered the usual one to be met with in the field.

In the following respects this system of grouping may be objected to. The group consists of 3 mounted and 1 dismounted signallers, and 2 horseholders. This group is too large and unwieldly and not sufficiently homogeneous to work advantageously as a unit. "A 4" and "B 4" can easily get separated from their group. The group cannot easily be sub-divided into two, since "A 4" and "B 4" are dismounted, and also the cable layers require both the horseholders. Again, if an advance is ordered and it is desired to reel in the telephone line, the entire group is out of action until this has been done as the telephonists have different horseholders. For the same reasons, it is not adaptable to work by dispersed sections. In this case, one pair of signallers with horseholder is generally sufficient to send out with the section. This disorganizes a group, in fact it practically destroys it. Similarly, if an officer's patrol with one signaller is sent out, a whole group is disorganized. The system is also wasteful of one mounted man, as one horseholder only holds one horse in the case of "A 3" and "B 3."

The principle of having signallers with the battery, yet not employing them, also seems rather wasteful in man power. Yet this is contemplated at the beginning of an action. "B" group normally remains with the wagon line.

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Thus the battery position is denuded of signallers at the critical moment, namely, between the selection of the position and arrival of the guns. "A 3" is presumably laying the line, "A 4" is back with the guns, and the G.P.O.A. is assisting the G.P.O. with the director. Two men are supposed to mark the line, but no men are forthcoming. It is of great assistance to the battery leader and to the battery, to have these men in position well before the guns come up. If the G.P.O. does this himself, he is "cramping his own style," at the moment when every second of his time is precious. Also visual signalling with the O.P. cannot be established till the battery comes up.

The organization does not admit of a mounted orderly on the staff—such an indispensable man on service—if the number of staff horses is to be kept down to 15.

Lastly, after an advance, an officers patrol sent out, a section sent forward and a casualty to one of the signallers, the group system will have completely vanished and the staff will have dissolved into something unrecognizable.

But, it may be objected, doubtless the system is not perfect, but casualties, etc.; will disorganize the best organization in the world —can you suggest a better?

With all deference, it is suggested that the system in vogue at the beginning of the war was a more serviceable proposition. Here every signaller mounted on a horse was given a job. Signallers worked in pairs, each pair usually being self-contained, that is to say, capable of laying a line, telephoning, or signalling by flag.

Working on these lines the following organization of the staff is recommended. Instead of four parties it will only consist of two, thus :—

"B.C's Party."	"Captain's Party."
N.C.O. i/c signallers } share a horse-	B.S.M.
B.C.A. } holder.	B.Q.M.S.
3 pairs of signallers.	Farrier.
G.P.O.A. } share a horseholder.	Mounted orderly.
G.P.O. }	

Total : 14 staff men and horses + 1 staff man and horse, total 15.

The 1st pair of signallers normally lay the line, dismounting and handing over their horses midway between battery and O.P. They also operate the telephone. The 2nd pair work at the O.P., the 3rd pair at the battery. The G.P.O.A. and B.C.A. are also signallers. In addition to the above 1 equipped signaller rides on the firing battery wagon of each section, and 1 wagon line signaller rides on a 1st line wagon.

If from casualties, from sending out an officers patrol or detached section, or from any other cause it becomes necessary to reduce the size of the staff, the first to be dispensed with will be the 3rd pair of signallers and horseholder; The next to go will be the 2nd pair of signallers and horseholder. The place of the former pair will be taken by the G.P.O.A. and a dismounted signaller; the place of the latter pair by the N.C.O. i/c signallers and the B.C.A. Thus even if a section is detached when the battery is in action, the 3rd pair of signallers can accompany it. These together with the dismounted

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section signaller, will furnish a section staff as large as any section commander has a right to expect. He generally has to get on with less.

The mounted orderly can be posted near the guns, dismounted holding his horse, if the wagon line is more than 300 yards distant. He can then gallop back with any long message. e.g., "Lt. Jones' section to advance with firing battery wagons; its first line wagons to remain with the battery; the farrier to accompany the section; Lt. Jones' horse to come straight up at a gallop; also the 3rd pair of signallers horseholders." Such a message is quite a natural one to have to send and would take a long time to signal back, especially as the least reliable signaller is generally made wagon line signaller. The Captain cannot be depended upon to be with the guns at this moment. He has many duties which demand his presence in the wagon line, or he may even be on his way to the divisional ammunition column.

At the same time certain signalling abbreviations can with advantage be added to the official list. "G.P.O.", "B.L.", "CAP" (Captain), "FAR" (Farrier) are obvious, "S" for B.C's Staff is a useful signal. It can be sent by morse by a mounted man easily, and can be read by anyone. The B.C. can even send it himself with his handkerchief, or even with his open hand at 300 yards or under. "The non-commissioned officer in charge of signallers" is rather a mouthful, and can be shortened into "chief signaller" with the obvious abbreviation "CS". Delay is often caused because a particular officer's horse is wanted "send up Lieut. Blankington's horse with horseholder" might be replaced by simply "BH" i.e., the initial of the officer followed by H for horse. "MH" would of course be "Major's horse." An abbreviation for "magnetic bearing" is wanted; "MAG" answers the purpose.

The following two examples will illustrate how adaptable this staff organization is to what may be called the abnormal requirements of war.

Example I. Imagine the guns in action 200 yards behind a crest with a second crest 1000 yards further forward and a house 600 yards further on down the forward slope.
It is desired to establish a first O.P. on the first crest, then extend the line to a second O.P. on the second crest, and eventually a third O.P. in the house, the full battery staff being available.

The procedure might be as follows:—

1st O.P. Megaphone can be used. Signallers not required. For the advance to the second O.P., 1st and 2nd pair of signallers, C.S. and B.C.A. go forward with the B.O., and 3rd pair of signallers man the 1st O.P., G.P.O. and G.P.O.A. at the guns.

2nd O.P. Visual is used to the 1st O.P. by 2nd pair. G.P.O.A. goes to first O.P.
Advance to 3rd O.P. (dismounted) B.C., B.C.A., C.S., 1st pair lay a line. 2nd pair continue to man 2nd O.P.

3rd O.P. When established the situation is as follows:—
At 3rd O.P. B.C., B.C.A., C.S. and 1 telephonist.

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At 2nd O.P. 2nd pair of signallers and 1 telephonist.
At 1st O.P. 3rd pair of signallers and G.P.O.A.
At guns. G.P.O.
B.C.A. and C.S. are both available to replace casualties.

If this is sketched out on paper the organization will be seen at a glance.

Example II. A section is detached and has taken with it the 3rd pair of signallers. There is a crest 1500 yards in front of the battery, and another 600 yards further on.

1st O.P. on 1st crest. Line is laid by 1st pair. 2nd pair go to O.P.

2nd O.P. 2nd pair continue to man 1st O.P., and visual to 2nd O.P., which is manned by the B.C., B.C.A., and C.S.

The trumpeter holds the B.C's horse just in rear of the O.P.

Thus, in both these examples, there are always 3 signallers at each intermediate station. Of course, casualties may make this impossible. One has known an intermediate station manned by a single signaller in a battle, and messages got through. The syllabus for 1st class signalling certificate might well contain some such test as this.

The predominant feature in a battery staff should be its *elasticity*. If our infantry advance rapidly it should be able to stretch rapidly. It should respond to their movement, either forward or backward, as the hands and reins of the rider respond to the motions of the horse's head. If this close touch an be maintained an answer is always forthcoming to the most essential question "where are our foremost troops"? But this is a most difficult thing to ascertain in a quickly moving fight. Even the infantry unit commanders themselves may not know exactly how far their troops have got. How then can the poor gunner be expected to? Even though he has a perfect O.P.

(1). He cannot always be sure that the foremost line he sees actually *is* the foremost line. We may have some more troops hidden from view, still further forward.

(2). If the light be at all bad he can mistake friend for foe even through glasses at 2000 yards.

Our cavalry were shelled by our own guns at under this range early in the war when no telescopes were available. The first shots fired in anger by one eminent battery were aimed at our own cavalry. At a vital part of the front during the battle of the Marne, our guns prevented our infantry advancing for several hours.

It is usual to hush up these sort of mistakes, but it seems cowardly and indeed dangerous to do so, if we are to learn the lessons of the war, and to realise the practical difficulties to be tackled.

One inference is obvious; telescopes should be readily accessible at the O.P. The trumpeter can carry the battery telescope and the chief signaller the signaller's telescope. But even with the best telescope it may at times be impossible to distinguish friend from foe. During 3rd Ypres some hours were spent in trying to discover who held Pommern Redoubt. Men could be seen lying on the hillside but their identity was doubtful. This is where the infantry could help us. They were in fact our own men, and if some signal had

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been mutually arranged between us and them, such as thrusting the rifle out to the side three times or extending both arms horizontally, all doubt would have been removed. Of course the signal would have to be frequently changed else the enemy in time might spot it and use it to mislead us. But this difficulty is not insuperable. Various mechanical contrivances, shutters, etc., have been devised from time to time for signalling back to the guns and it is up to us to encourage these experiments all we can. It is difficult to get infantry to think of signalling back. They are naturally absorbed with the enemy in front of them. Those men lying in front of Pommern Redoubt little guessed how many eyes were riveted on them, longing for some sign that would disclose their identity. This point should be drummed into the foot soldier until it becomes second nature to him to do all in his power to signal back his position. He cannot be sure that his signals are seen by us. He must not expect us to signal back an acknowledgement. Very many signals will doubtless be wasted. But what of that? The bare possibility that any of them may be seen should make it worth his while to send them.

So much for signals from infantry to guns. Now let us consider whether we cannot signal to the infantry. Let us assume that they are temporarily held up by some locality and we are shelling it for them. We are not in communication with the firing line and we want to give them warning that we are about to lift our fire in order to allow them to assault. By a previous mutual understanding the signal can be given by firing a burst of smoke shell and then lifting. This has the additional advantage of screening our own troops advance, or if smoke is not available a special form of fire such as 3 salvoes at 10 seconds interval can give the signal. Many other similar signals suggest themselves. We must improvise, and use our own initiative. Of course, if there is time and opportunity, the lift and burst of fire can be done at an agreed moment by the watch. But infantry watches are not always very reliable. Tragedies have ensued from troops going over the top too early. So it is best to say "at such and such a time I will fire in such and such a way. Then, but not before, begin your assault."

In hedgerow fighting the section commander comes into his own. A complete section he may find rather cumbrous and unwieldly in such country. But a single quick firer will probably be sufficient. If he can find one hole in a hedge through which he can poke the muzzle that is all he requires.

One 4-gun 18-pr. battery fighting in such country near Avesnes, was eventually working entirely by single guns, and doing very good work too. In all such cases improvisation and initiative are required. No one, nowadays, under-rates the value of standardisation. Its advantages are obvious, but it may be overdone and may tend to cramp the style of a young officer. In the last resort *standardisation is the enemy of initiative*, and without initiative there can be no progress whatever—progress owes its very existence to initiative, and therefore if standardisation is over emphasised progress is impeded. Therefore young section commanders should be given the freeest possible hand in conducting their operations in the field and in the methods

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by which they should support their own infantry. Thus, in the advance, they should not be afraid to move forward on their own. It is risky to give an order such as "do not advance beyond so and so until further orders." The orders may never arrive. In one of the last battles of the war a brigade commander instructed his B.C's to meet him at a certain spot in the recently captured lines. They all arrived there, but no colonel: eventually he arrived on foot, having lost his horse, but a whole brigade had been kept out of action during that delay.

Now, if batteries are to leap-frog forward over each other, it demands the presence of the brigade commander on the actual ground to co-ordinate it because the rate of advance of our own infantry cannot be foreseen, nor the time necessary for each battery to get into its new position. And owing to constant shifts, personal and visual communication with his batteries is all that the brigade commander can expect. If he is with the infantry commander all the time he cannot expect even this.

This brings us on to the question of the relative positions of the infantry commander and his O.C.R.A. It has been said that the two should "hunt in couples," infantry brigadier with A.B.C., battalion commander with B.C., company commander with X.C. It is a pretty picture, but——. Well, one must not appear too unorthodox, but the fact is the infantry commander, whatever his rank, is not usually called upon to cover the ground to the same extent or at the same pace as his artillery confrère. The latter, in addition to ascertaining the position and needs of the infantry, has his technical reconnaissance to do. He does not wish to put these two duties into watertight compartments. By galloping about he may simultaneously pick up the situation and ascertain the lie of the country from the point of view of coming into action.

The infantry commander will not require to do this, so that if the O.C.R.A. feels that he ought, as far as possible, to keep near the infantryman and only be away for as short a period as possible, the inevitable tendency will be for him to skimp his reconnaissance, and yet we all know that "*time spent on reconnaissance is seldom wasted.*" Our drill books recommend and encourage the commander to make his headquarters as near the artillery O.P. as possible. But what if he declines to do so? Is the B.C. to leave his battery and accompany him? Or send one of his officers to accompany him? The brigade commander can certainly leave his adjutant, but battery officers are so perilously few in moving warfare. One of them should nearly always be ahead on patrol, unless the B.C. is doing this himself. If the latter has to send one in addition to battalion headquarters it is odds on his recalling the officer's patrol. A subordinate artillery officer cannot do much good at battalion headquarters. He can merely send messages to his B.C., conveying the wants of the infantry. Cannot the infantryman send this message himself without having a gunner "sitting in his pocket"? A detached section is more efficient if the 4th subaltern accompanies it. A detached section commander by himself and a small staff has a much more difficult task than the B.C., with his whole staff and full compliment of officers

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to help him. Therefore he likes to send a 2nd subaltern with the detached section. This leaves him with two only. If one of the two has to go to battalion headquarters *and stop there* the battery is badly handicapped; sending out another detached section, should the occasion arise, will now be quite out of the question. The position will very likely be worse than this even, as owing to casualties, etc., a battery is unlikely to have a spare subaltern for long. Rather it would seem that the B.C. can render best assistance to the infantry by either himself or one of his subalterns galloping across from time to time to infantry headquarters to compare notes and news very likely picking up and disseminating further information on the way. This rough and ready form of liaison proved quite effective during the March retreat.

Also, it sometimes happens that battalion headquarters is on a forward slope, or exposed spot that cannot be approached on horseback. In this case unless a telephone line is laid to the battery, a dismounted gunner liaison officer is merely a prisoner, while if a line *is* laid the commander can speak direct to the artillery himself. In either case the gunner would be more usefully employed with his guns. Frequent reference has been made to the foregoing remarks to officers "galloping about". This has designedly been so because one of the outstanding lessons of open warfare on the Western front has been the value of the horse as a means of communication. Any system of mechanicalisation which does not produce an equally mobile means of communication will be doomed to failure. A speck of dirt may put a machine completely out of action for a time. It requires a good many specks of dirt to quench the vitality of a horse. In the phase of operations that we will now consider a horse is more than ever indispensable to the gunner officer, namely in the retreat. The system of gradually extending the O.P described above will not answer in a retreat. The converse is rather to be desired. When the battery first comes into action, the O.P. should be at its greatest distance from the battery, and as time goes on it should gradually fall back on the battery. But this is a most difficult operation to execute. In the first place the B.C. is chary of laying a line, as he does not expect to be able to reel it in again. Secondly, in a retreat, the B.C. is generally with or near his guns. Whoever the officer may be who endeavours to establish an O.P. well forward, he cannot do much good until he knows where the battery may come into action. At any moment he may be forced to shift his O.P. further back, and he cannot observe and control fire from a moving O.P. It is also in the nature of a retreat that the staff should be short-handed from casualties. The signallers and officers are the most exposed portions of the battery and consequently are the first to suffer. In fact, if the enemy are really on the move the regrettable fact must be squarely faced that a battery can rarely expect much information from any O.P. except one that is quite close. If the facts were disclosed, it would probably be found that our batteries were generally astonishingly "blind" during retreats in the late war.

What is the remedy? Probably there is no remedy, only a palliative, and that palliative is the horse—the horse with an officer

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on his back. It is literally impossible to over emphasize the importance of the horse in these circumstances.

Another formidable difficulty to a B.C., is, when he is left to his own resources, whether he should withdraw or not. Here again the horse may be his standby. A rapid cast round may disclose the situation to him, or he may send out two officers a few hundred yards on either flank (also mounted). If left to himself he may be in a painful quandary. If he elects to remain, his guns may get into an impossible position and fresh infantry may have to be brought up to extricate them, and if they eventually fall into the enemy's hands it will tend to add to his prestige and moral and correspondingly lower ours.

On the other hand it may be the means of enabling our infantry to hold on, encouraging them by their presence, as did those heroic guns at Le Cateau. Also, if the infantry continue to fall back, quite a strong defensive line may be formed through the guns. It is an axiom that guns can cover their own front, and if infantry stragglers can be lined up on the flanks of the battery the line is thus prolonged and may require a considerable force to turn it. In any case no decision to withdraw, failing any instructions from higher authority should be come to without searching out and discussing the situation with the local infantry commander. There also the horse may prove invaluable.

If a retreat has to be executed it is desirable that the procedure should be, as far as possible, similar to the advance. As to whether a battery should retreat in one body or by sections would depend largely on whether the part was being covered at the time by other batteries. If not, the same principle of leap-frogging should be employed as in the advance. This may even extend to single guns.

The normal procedure for a retirement assumes that another position will shortly be occupied. But this will only happen in the case of retirement "according to plan"—frequently, retirements are more in accordance with the enemy's plan than our own. In such a case it may pay the B.C. to seek out higher authority the moment he has got his guns on the move rather than to send his G.P.O. on a wild cat reconnaissance of a position which there may not be the slightest prospect of occupying. Yet a further difficulty in a retreat is that infantry units may get mixed up and the troops in our immediate front may be strangers to us. But whatever the situation and whatever the difficulties, the same line of action always seems to be indicated: "Get on your horse and go and find out". But all this continuous use of the horse, combined with the rigours of the campaign, will make big demands on the animal. An officer can easily get to the bottom of three chargers in an extensive operation. The moral of this is obvious. As long as we continue to be mounted on horseback none but good doers should be allowed as chargers, and they should be kept at all times in really hard condition, for, to paraphrase the Prayer Book, "In the midst of peace we are in war," and it is then too late to remedy matters. The officer who selects a flashy looking charger because "it looks well on parade" or because "it might win a race," has only himself to blame if in his sorest need he finds himself exclaiming with King Richard:

"A horse! a horse! My kingdom for a horse!"

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THE EMPLOYMENT OF PACK ARTILLERY IN OPEN WARFARE.

BY Major T. C. LEAH, D.S.O., R.G.A.

I.

THERE is nothing more remarkable about the outbreak of any great war than the absolute confidence of the naval and military forces on either side to obtain for themselves easy and overwhelming victory. Those of us who were in India thought we should arrive too late for the capture of Berlin, while the Germans believed that Paris would once again be in their hands before the fall of the leaf. Not only were we confident about results, but we were also confident about our methods: cavalry, artillery and infantry formed a perfect trinity whose tactics were so co-ordinated as to ensure victory. The theorizings of a civilian (Block), who thought that the developement of weapons would bring about a stalement condition of trench warfare, were treated with the contempt that they deserved.

The end of the war, as complete and overwhelming a victory as any we had ever imagined, left our theories untouched but our methods altered out of all imagination. The influence of wire and trenches introduced trench weapons, becoming more perfect from day to day, while light automatics and machine guns absorbed more and more bayonet power. Artillery, light, medium and heavy, increased out of all proportion, and enabled the creeping barrage to be introduced and developed: air power became not only important but all important, and the command of the air vital for victory or for defeat. Gas complicated the situation and introduced new problems; the tank began its development from prehistoric types, and seized the imagination, not only for what it did achieve, but for the developments which are bound to make it the ruling factor in the battle of the future.

Victory found us with more open minds on military subjects than we had held before our theories had been tested: we had obtained solutions, at certain times, to certain problems, and had won the war by doing so. But the variable factors, i.e., enemy morale and development of weapons (tanks and aeroplanes included) made these solutions only absolute at the moment when they tested: the fact that a certain method brought victory in August was not evidence that it would have been successful in the previous February, when the enemy's morale was higher, or in December, when an antidote had been thought out to make the plan of no effect.

Generally speaking, the antidotes introduced in 1918, which broke up trench warfare and enabled attacks on a grand scale to succeed, were:—

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(a) The doctrine of infiltration, generally known as "soft spot tactics".
(b) Smoke to mask and gas to deny certain areas.
(c) Tanks.
(d) Secret concentration of artillery mass, co-ordinated under central control and working on a fixed time table, putting down a moving screen of fire, behind and under cover of which the infantry advanced.

(Improved survey methods and perfect mapping enabled fire to be opened without previous registration).

No antidote was found for the tank, anti-tank guns and rifles being generally unsatisfactory. In the 100 days the tank beat itself by developing mechanical defects which forced it out of the battle after a few days of continuous work. This is not likely to occur in future, and the problem will be further complicated by the fact that both contending armies will possess tanks in the next war.

So far as the artillery are concerned, it must be acknowledged that the remedy was only available and suitable at the period when it was applied. No such volume of artillery, with unlimited supplies of ammunition, and large scale maps of extreme accuracy, can ever be available at the outbreak of the next war, to enable exact and overwhelming fire to be brought down as required. The factor X will have to be applied to allow for the deterioration of the enemy's morale between 1914 and 1918 and the factor Y for the tanks with which the next war will find our foes supplied.

Even taking things as they were the gunner would be the first to acknowledge that our artillery success was not complete. The moving barrage was, necessarily, absolutely fixed and unchangeable : whatever happened to our infantry, whether they were in front of it or behind it, whether they met with great resistance at some points and with little or none at others, no alteration was possible : it proceeded relentlessly to its predetermined end, and after that a great hush fell over the battlefield. Nothing was more surprising to some of us who came back to France from "side shows" in 1918, than this almost complete cessation of all artillery fire at this stage. The reason, of course, was obvious. Nobody knew where our infantry had got to, and to what extent the attack had been successful. If they had reached their final objective they were out of touch, exploitation might have set in, and no firing could take place until communications had been re-established, and the guns had moved forward. If the infantry had not been completely successful, as was normally the case, then a hundred small battles were going on over an incredibly indented front, and it was almost impossible to distinguish friend from foe. The higher command had lost touch with the battle and the power of controlling the combat, at zero hour, while the artillery, who obtained their orders and the bulk of their information, from higher formations, were also and necessarily, temporarily out of touch also.

The only people who could really help at this stage were the battalion light mortars, which were almost invariably out of ammunition, and the 18-pr. close support sections, moving in touch with the

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infantry they were detailed to assist. These latter were limited in number, since they could not both fulfil their role and take part in the barrage, and in value since they were conspicuous and vulnerable to machine gun fire. Had howitzers, instead of the flat trajectory 18-pr., been selected, they would undoubtedly have achieved better results. But they were not available.[1]

To-day the light Stokes mortar has been abolished as part of the establishment of the infantry battalion, and the 3·7″ pack howitzer has been introduced for the special purposes of giving the infantry close support in open warfare, and for defending them against tank attack. This article aims at discussing by whom and how these new weapons should be controlled, and offers some remarks on their handling when used as (a) close support and (b) anti-tank weapons: the question of future developments is also touched upon.

II.

Centralization and decentralization of commands.

The letter which states that the 3·7″ howitzer is the weapon selected for close support and anti-tank work also states that these weapons "will form part of the divisional artillery but may be allotted in all or part to infantry brigades at the discretion of the divisional commander." It is recognised that when used in close support it is impossible for higher formations to exercise efficient control, but that the guns so used must pass under the command of the formations with whom they are actually working. The questions that arise out of this decision are (a) at what point the divisional commander will be well advised to transfer his close support weapon from his C.R.A. to his infantry brigade, and at what point he should order them to revert to the technical handling of the C.R.A., and (b) when transferred to infantry brigades, who is actually to control them, the Colonel Commandant Infantry Brigade or the battalion commanders with whom they are actually working?

As regards the first point so soon as a possibility exists of meeting the enemy, the main body will be covered by protective troops, namely, vanguard, mainguard, rearguard or flankguard, as the case may be. Each of these formations is under a commander, who will look upon the senior artillery officer working with him as his C.R.A., and will expect him to collate the work of all guns in his command, and direct their tactical handling in accordance with instructions received. These guns may be field, medium, or pack artillery, or all of them, but the principle is the same; the senior artillery officer present with the force will co-ordinate the action of artillery units present to carry out the wishes of the commander.

If therefore, it is desired to bring all or a portion of the pack artillery present in any formation under the direct control of an infantry commander, special arrangements will have to be made to do so. The march table would show the battery or section in question moving with the unit to which it is to be affiliated, and a statement

[1] 4·5″ howitzers were used for close support at the battle of the Marne and the Aisne and did good work.

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made in the body of the order to that effect. The C.R.A. of a formation will then know that these weapons will not be controlled by him, and he will make his plan independently of them.

It is suggested that when commanders intend (in certain contingencies) to use close support weapons under direct orders of the infantry, these weapons should be definitely placed under the orders of the formation with whom they are to work from the time such contingency appears possible or probable.[1]

The next point which appears to arise is, at what period the commander will direct the pack artillery which he has so allotted to infantry brigades, to rejoin the divisional artillery of which it is a part?

It is generally agreed, that to obtain the best results out of technical weapons, it is necessary to have technical handling. But in the encounter battle and in attack generally, the infantry must have close support to enable them to defeat the technical weapons of the defence, and such close support is best given by artillery weapons, moving close up and in close touch with them. The necessity for their moving close up is due to the fact that at a distance it is impossible to discover the situation, changing from moment to moment and to identify targets, and to distinguish friend from foe. Therefore in the attack, the minor evil of handing over a certain amount of artillery to the control of non-technical infantry commanders is faced and accepted.

On the other hand, so soon as static or defensive warfare sets in, the same conditions do not apply. Within a few hours of stalemate having been reached the artillery commander will know the actual position of our front line and the approximate position of that of the enemy : armed with this knowledge he will make offensive—defensive plans, and take advantage of the ground to bring enfilade and cross-fire to bear, using all the weapons under his control in such a way as to get full value out of the qualities and characteristics of each type. The battery commanders, having been instructed as to the zones and tasks for which they are responsible, will have reconnoitred the forward areas, selected observation posts and linked these to their guns by telephone.

Under these conditions there is no outstanding advantage in keeping artillery weapons under the orders of infantry commanders, and it is suggested that so soon as the divisional commander gives up an immediate intention of resuming the attack, close support weapons

[1] An exception would occur, when, in an organised attack, a paucity of artillery weapons compels the commander to use his pack howitzers, both in the opening stages of the attack for concentrations or modified barrage purposes, and, at a later period, to accompany supporting infantry who are going to pass through the leading troops and push on to more distant objectives. In this case it would appear necessary for the commander to allow the guns sufficient time to cease firing and reach the same area as the units they are going to support, before these move forward in battle formation. Unless touch is established before units move forward, it is unlikely to be gained subsequently.

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should revert to the control of the C.R.A., and be employed by him in normal artillery work.[1]

The last consideration is—when close support weapons are actually allotted to infantry brigades who is to control them, the colonel commandant or the battalion commander?

The theory of close support weapons has been evolved from the necessity of obtaining immediate assistance for the infantry in moving warfare, thus enabling them to deal successfully with the problems of the moment, as soon as possible after they arise. This support is obtained, so far as the O.C. guns is concerned, by getting exact information, not only as to the general direction but as to the exact position of targets to be engaged. Both the number of his guns and the amount of ammunition are strictly limited and he cannot hope to produce results of any importance by shooting at an area (except by smoke). He (or his representative) after getting general orders from the battalion commander, must go forward, liase with company, platoon, and even section leaders, until he can obtain the information which he must have, namely, the exact location of the enemy which are holding up the advance and against which the support of his guns is required. The guns must be in continuous touch with him, and must not be too far away. It is suggested that they will have to move in the same area over which the battalion is moving and, as a general rule, somewhere in the neighbourhood of the support company.

That being the case the whole of the personnel of close support weapons will, when they are functioning as such, move with one battalion. Officers, men and mules will be there, and will be looked at somewhat askance by infantrymen of war experience, who know what extra fire additional targets are likely to draw on the area they are moving over. They will wonder whether their room is better than their company and whether the assistance they can give is greater than their obvious drawbacks. To get over these very natural feelings the closest understanding, sympathy and unity of thought will be necessary between the two arms, and for this purpose the more battalions and close support artillery can train together and get to know each other the better. If in war, Sergt. Smith temporarily commanding No. 3 platoon somewhere behind, and who has chanced on the best bit of cover in the neighborhood, suddenly sees several gun mules, who have dropped their loads into action, trotting in his direction with the obvious intention of sheltering there, he is as likely as not to shoot one or two before he lets them join up with him. But if Sergt. Jones, in command of the animals, is an old friend of his, and Flossie, the leading mule, is accustomed to eat half his sugar

[1] From an anti-tank point of view, it may often be desirable to emplace a few guns right up for defensive purposes. The 18-pr. from its stability, flat trajectory, and higher rate of fire, is the best weapon at present available for the job. In the attack the 3·7″ howitzer can fulfil a valuable secondary role as an anti-tank weapon, 18-prs. not being present or available in the forward zone. But when both weapons are available, there can be no comparison between a light howitzer and Q.F. flat trajectory gun. So soon as the intention to attack ceases, field guns can be brought up under cover of darkness to positions as required, and the howitzers withdrawn to fulfil their primary role of infantry support, which they will normally do better on the defensive from positions rather retired from the front line zone.

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ration, then the situation is different and he will make the best of a bad job.

It is then suggested that when pack artillery cease to be commanded by the C.R.A., they will pass sooner or later under the command of the battalions. But, some people consider, there will be an interim stage during which the colonel commandant infantry brigade will keep them in his hand, and send them into the fight in accordance with the progress of the battle and the information he may obtain from personel reconnaissance and the reports of his battalion commanders. In this case they will probably move with brigade headquarters, and may have a considerable approach march to make before they can fulfil their role : they will, probably, eventually reach areas where their presence is more needed than if they were battalion guns, but *they may arrive late*. At this later time information will have to be got in a shorter time and be more difficult to get, and the gunners in their search after knowledge, etc., will not have that sympathy and understanding that would have existed had they worked with the same battalion from the beginning of the operations.

It would appear that to keep the close support battery under the colonel commandant infantry brigade, has less justification than the brigading of machine guns, which is understood to be unpopular with battalion commanders as a rule. Machine guns are usually concentrated for barrage work, a role for which the 3·7″ howitzer is neither suited nor required in close support. On balance there appears to be little justification for taking the 3·7″ howitzer from the expert handling of the C.R.A., and its brigade commander, if it is to remain concentrated under the hand of the colonel commandant infantry brigade. It appears to the writer that when the time comes to hand over the close support weapon to the control of the infantry it would be preferable to go the whole hog, and for the infantry brigade commander to place sections under the direct control of battalion commanders from the commencement of operations.[1]

III.

Some practical problems which arise in tactical handling when command is decentralised.

Whoever may be the authority officially responsible for the control of the pack artillery sub unit in close support of infantry, in practice the control is always exercised by the O.C. infantry unit with which the guns are actually working, that is the battalion commander. If the troops change, the command changes also, a fact that is bound to create difficulties of liaison and control both for the guns and for the infantry. In some cases which have occurred in

[1] When pack guns are attached to a battalion, a peculiar situation may arise, and has actually arisen, where the battery commander is senior (by brevet) to the battalion commander, and will hence, under present regulations, have to command a unit to which he is attached. The whale was not much inconvenienced by swallowing Jonah, but if Jonah had swallowed the whale his feelings would have been similar to those of the battery commander above described.

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recent staff rides, where the use and employment of the new weapon have been by no means neglected, they have moved with the leading battalion to the attack of the first objective, and then been handed on to the supporting troops, and passed with them through the first to more distant tasks. In fact, wherever the leading troops are, there pack artillery are also—in theory—to be found.

Inconspicuous as we believe ourselves to be, and valuable in our capacity to give powerful support to the infantry, the average pack gunner is a little pained at the proved intention of some people to use him as the high command used Uriah the Hittite, with the added disadvantage that, unlike Uriah, we knew the intentions regarding us before we proceed to the forefront of the battle. Heavy losses mean accelerated promotion, and accelerated promotion is an excellent thing so long as it does not take place at one's own expense, but it is suggested, in all seriousness, that the losses that are likely to occur if close support weapons are used in this way are out of proportion to the benefits that will arise. Speaking generally, casualties to troops vary proportionately to their distance from the enemy, and infantry guns will suffer more heavily than any other types of artillery during moving warfare: if badly handled, their losses will probably be comparable to those of the infantry, while the technicality of the duties both men and animals have to perform, render the replacement of casualties more difficult. It is not impossible, that if close support weapons are used as above described, casualties to men and animals and their replacement by partially trained men and mules, may force pack batteries to work entirely in draught within a short period after the outbreak of the next war, with a consequent grave loss to their mobility. It is suggested, that for any one operation, the battalion and its close support weapons should be considered as an indivisible whole.

The officer in command of these weapons (normally a section) will have to serve two masters: the battalion commander who is at the moment, and actually, its O.C. and in charge of its tactical handling, and the battery commander who is its present head, and who will (presumably) be still charged with its administration, ammunition supply, and the replacement of casualties.

This sub unit will not be on the same footing, either for liaison or tactically, as trench mortar sections during and after the war. The latter were purely infantry units, and had no *raison d'etre* or existence apart from the battalion with whom they worked. The guns which will now take their place, will belong to batteries which have consecutive traditions as old and as honourable as those of the battalions with whom they will be employed, and belong to the most important regiment in the army. Their training is high, their weapon is both powerful and accurate, and they may, at any moment, be withdrawn and reunited with the batteries from which they were temporarily detached, to act as ordinary field artillery under their divisional C.R.A's.

It follows then, from this, that there are fresh problems both of *liaison* and *tactical* handling to be considered, which are not yet dealt with in the training manuals. It is suggested that the question of

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liaison is not one which can be solved by rule or diagram. Good liaison, as the Great War proved, is primarily a question not of methods but of manners. Knowledge is all important, and interknowledge begets confidence; with good manners, good will and confidence, good liaison must follow. Would it not be a good thing if the battalion commander, professionally, looked upon the commander of his guns as his artillery adviser, and from an administrative point of view, regarded his artillery sub unit in exactly the same light as he would an infantry company from a neighbouring battalion, temporarily attached to him for some special purpose? The officer in command, may, and frequently will, be of junior rank, but neither his professional opinion, nor the status of his section, should be allowed to suffer on that account.

When on the march he should be permitted to accompany the battalion commander, bringing a small staff (not exceeding five mounted men) with him. During the preliminary reconnaissance before battle, the battalion commander is already accompanied by his company commanders and his machine gun officer. It is questionable whether it is advisable for the O.C. guns to come with him or not. The advantages are, that he can listen to what is said to other unit commanders and absorb the whole scheme without having to have it individually explained to him and that the battalion commander knows exactly what he has seen and how much he knows, which makes subsequent instructions more simple and more satisfactory. On the other hand the drawbacks are that the O.C. guns is the only person with a mobile staff and mounted horseholders: to tie him to the battalion commander is to deny him the use of his superior mobility, while his additional staff will make the reconnaissance party more visible, and will tend to draw enemy fire. The O.C. guns, also, does not approach the problem to be attacked from quite the same angle as the infantryman; he requires more information about terrain and covered approaches, and is not so interested in extensions and company bounderies. If he cannot obtain the information he wants, he will be unable to express a final opinion when he is asked his advice.

If it is decided that the O.C. guns and his staff will reconnoitre independently and not accompany the battalion commander in his reconnaissance, he will require the following information before he sets off upon it:—

(i). An outline of present orders and probable plans.
(ii). Any further instructions with regard to probable assistance required from the guns.
(iii). A timed rendezvous at which he will again meet the battalion commander, render his report, and receive final instructions.

The battalion commander, having completed his reconnaissance, will have decided when, where, and how to attack, and on the employment of his close support weapons. Generally speaking he may employ them in one of four ways, always remembering that the ammunition supply (120 rounds a gun) is scanty and its augmentation on the day of battle by no means certain:—

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(a) In reserve moving up under cover, behind, but in touch with his headquarters.
(b) In action, in observation, where the ground is favourable to such a course.
(c) Moved up in support of a certain section of his line, where their fire power is necessary, either to support it or to obtain a decision.
(d) Split by single guns, either with one in reserve and one up, or with both up, assuming an officer is available to command each gun. When guns are split they should be split in depth only. They cannot either be efficiently controlled, or supplied with ammunition, when acting on different company fronts.

In giving his instructions[1] as to their employment it must be remembered that the battalion commander *is* the O.C. infantry guns, and as such has a right to control them down to the smallest detail. The question is, whether he will get the best results by so doing. The answer appears to be, that there might be occasions, when, with an incompetent or an extremely pigheaded O.C. guns, he has to take complete control in an emergent situation, but that, speaking generally, results would not justify him in such a course.

Excluding this exceptional case the procedure would appear to be as follows. The battalion commander would decide that he wished to employ his guns for a certain purpose, and would so inform his O.C. guns (who will be with him, having completed his reconnaissance) and ask him how he proposed to carry out his task. The O.C. guns would consider, make up his mind, and state his suggested plan. The battalion commander would make any alterations he thought necessary, and these might fairly be discussed. The battalion commander would then give his final decision and the plan should be considered as "sealed," so far as any tactical action in the front line can be.

Once the battle has been joined it is suggested that so far as the O.C. guns is concerned, he should be with the battalion commander (except when absent on reconnaissance) until both his guns are committed to action, after which he will join them, leaving an orderly at battalion H.Q. He himself will be responsible that the battalion commander knows where to find him if wanted. Before guns are in action it will be the duty of the officer actually directing them to keep touch with the nearest company: once in action his duties will not allow him to do this, and it is suggested that company commanders should be asked to send an orderly to any guns which are actually firing near them, giving location of company H.Q., and any information of value.

Ammunition limbers will be under cover and as concentrated as possible, somewhere between support and reserve companies, and from them ammunition (on mule back or in the limbers) will be moving forward to supply the forward guns, afterwards returning

[1] The word "instructions" and not "orders" is used throughout, since it is considered obvious that the O.C. guns must be given a free hand to carry out any tasks allotted to him, by the method which he considers most suitable to his equipment and personnel.

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empty. This fact must be noted and everybody must do their best to help them on their way, directing them where necessary. The mules and limbers of infantry guns will require cover to conceal them both from the ground and from the air, if they are to function successfully. This must be noted by all ranks, otherwise there will be a tendency to earmark the best spots for the battalion itself, and its guns will suffer correspondingly.

IV.

The position of forward guns.

(a). With reference to the Front Line.

(b). With reference to the crest.

(a) The words "close support" do not necessarily mean that the weapons who furnish it must be close up, but that the support that is given must be close, i.e., that the projectiles fired from these weapons must be so directed as to cover the advance of their infantry, striking objectives immediately in front of them, and yet without endangering their own safety. For this purpose it is necessary that the observer should be near enough to see his target and the present position of his infantry and that he should be able to get orders quickly and easily back to his guns, by voice, telephone, or lamp.

The position of the observer is therefore fixed by the nature of the country and by his powers of vision; he must be able to distinguish between friend and foe, and also able to watch our infantry as they advance, the enemy as they counter attack. Under normal conditions, I think it will be generally agreed that to fulfil these conditions he will have to be within 1000 yards of his objective, and therefore either in, or near the front line held by his infantry before they attack. This position will also be forced upon him by the fact that he will largely rely upon the infantry to spot targets, and such information is more likely to come out of the firing line than elsewhere. The same rules do not govern the position of the guns. From the anology of infantry weapons it is generally believed that the nearer the gun can get to the target the better chance it has of hitting it, and when gunners state the contrary they are not usually believed: nevertheless, up to 2000 yards the statement is perfectly true. Howitzers shooting at ranges of under 1000 yards have to use their lowest (i.e. smallest) charge to enable them both to take advantage of cover and also to hit the target without endangering intermediate troops. The 3·7″ howitzer is as accurate firing with 3rd charge at 1000 yards as it is with 1st charge at 500 yards, and as accurate at 2000 yards as the 1st (lowest) charge is at 1000 yards.[1] The question of accuracy does not come into the problem and the factors to be considered are (a) communication, (b) ammunition supply, (c) moral effect, (d) freedom of manœuvre.

Communication. Voice control is obviously the best method and lamp the worst: telephones will give good results as long as the wire

[1] Vide range table 40/WO/7226.

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is not cut. Under the rough and ready conditions of battle, in open warfare, in the front line area, it is suggested that 1000 yards is the maximum distance over which good communication can normally be kept up. From this it follows that weapons intended for close support must be capable of being brought up with their ammunition to positions to within 500—1500 yards of the front line. The pack howitzer can move either in pack or in draught, take advantage of cover and, properly handled, is inconspicuous over any country, can go almost anywhere infantry go without using their hands, and therefore may be considered suitable for the purpose.

Ammunition supply. Eight rounds are carried by each mule in pack and 32 on each limber in draught, to a total amount of 120 rounds per gun. When lines of advance to guns in action are so swept by hostile fire as to serious retard ammunition supply their utility will be diminished and their casualties increased. This point must be considered as a factor in selecting gun positions.

Moral effect. This cuts both ways; guns too far up will be liable to be taken by counter attack. Speaking generally it is presumed that the further guns can get forward, the better is the moral effect of their presence on the infantry they accompany.

Freedom of manœuvre. So long as observation and communication are good the further guns are back, in moderation, the more they preserve their powers of manœuvre, and the more generally valuable they are for the battalion front as a whole. The nearer they come to the front line, the more certainly are they pinned until the line again moves forward, and the more parochial is their outlook. When right up, they are not available for other tasks, or to support other sections of the attack.

Summarizing the above it is suggested that everything must give way to good observation and good communication; but that if these conditions are obtained, the guns should not be emplaced in or near the front line, if equally good conditions are available further back.

(*b*). *Position of forward guns with reference to a crest.*

The further guns can get back (while keeping good and easy communication with their O.P.) behind the crest that conceals them, the better. The reasons are that—

(a) Guns tucked up behind a ridge cannot shoot so "close" as those further back, since their shells cannot clear the intervening obstacle so easily.

(b) In the event of successful enemy counter attack guns immediately behind a crest cannot function. When placed further back they can serve as rallying points to the infantry, and can deny that crest to the enemy by fire.

(c) The back position is a favourable one for anti-tank work, while in the other if tanks appear, the guns must run up on to the crest itself, or perish in the attempt.

V.

The 3·7″ howitzer as an anti-tank weapon.

The perfect anti-tank weapon must possess three essential qualities, accuracy, high rate of fire, and high muzzle velocity, and must

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be mounted on a carriage which will permit of rapid traverse in any direction, so as to enable fire to be kept up without pause on rapidly moving targets.

It must be acknowledged that while the 18-pr. Mk. V. almost fulfils these conditions, the 3·7″ howitzer does not do so very well. The carriage does provide the necessary traverse, but the rate of fire does not exceed eight rounds a minute, the muzzle velocity is low (as that of a howitzer must be), and the accuracy is modified by the fact that the carriage was not built for firing with full charge at short ranges, and tends to jump after each round unless the ground is very favourable.

"In the defence the 18-pr. would, better than any other gun, fulfil the role indicated on page 144, A.T. Vol. III., given time and opportunity to bring it up to its advanced position, and to camouflage that position carefully. But in the attack, whether deliberate or encounter, it is open to question whether the 18-pr. with its six-horse team and its ammunition wagon is not too conspicuous to function successfully in the front line area." Experience also shows that to engage tanks successfully they must be fired at over open sights; the gun, therefore will have to come into action in the open with a considerable field of fire, so as to enable it to see and deal with targets as they arise. Positions in the open are unhealthy anywhere, but doubly so in the front line area, while if the enemy possesses close support howitzers, they are likely to be quite impossible to live in. Finally the artillery at the disposal of the C.R.A. is strictly limited, and it is in the highest degree improbable that he will be able to spare any of it to wander about on necessarily roving missions for anti-tank purposes, and keeping absolutely silent unless the tanks they are guarding against happen to turn up.

It may then be accepted that 18-prs. will not be used in attack for anti-tank work in the front line area. It is also clear that they will not be able to perform these functions from positions further back, as although from thence they may be able to see the tanks moving about, they will not be able, in the confusion of battle, to tell whether they are friends or foes, or where our own infantry have got to.

It follows that the only weapons which (as our army is at present organised) are available to deal with tanks at short notice are the pack howitzers. How far are they competent to fulfil this task, in combination with their primary role of close support? They will be in action well behind a crest with their observer on or in front of that crest, and a clear field of fire to it. The observer will see the tanks coming and will give his guns due warning, both as to their numbers and the approximate direction of their advance; the guns will therefore be all ready for them at the moment they appear, at which moment also, they will have to slow their pace, as they will be coming over the crest and on to dead ground: the range will be anything from two to six hundred yards. It is suggested that, under these conditions, the odds on the gun getting the tank are good, in fact two guns might reasonably be expected to be a match for three tanks, but where more than three tanks come over simultaneously, then the

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odds will be with the tanks.[1] Close support weapons are then, an antidote against a tank break through, provided that tanks only appear in small numbers; in large numbers there will be nothing seriously to stop them until they come into the area where the field guns are emplaced, when the 18-pr. will be able to show what it can do.

As stated, they are an antidote against a tank break through, but they will not be able to act until the tank appears over the crest which is giving them shelter; this crest will not normally be that occupied by the most advanced infantry, it will be more in the area of the support company, and the writer can see no means of emplacing close support weapons so that they can deal with tanks as soon as they appear, as well as fulfilling their normal role. The fact is that the requirements of design for a close support weapon and an anti-tank gun are different; the 3·7″ pack howitzer is a first class close support weapon and a second class anti-tank gun. It would be easy to design a first class anti-tank gun with second rate qualifications of close support; a compromise might result in the developement of a weapon which was not first class in either respect. It would appear that such a compromise is to be avoided, and that the present solution, which considers close support functions as of primary importance, is the correct one.

It is often forgotten that the gun is not the primary defence against the tank. The primary defence against one tank is another tank, in the same way as the primary defence against ships of war are other ships of war, and against hostile aeroplanes our own aeroplanes. Defended harbours are provided to cover our naval bases, to give our ships security when at rest and freedom of manœuvre when at sea (because of the refuge which exists behind them), while our anti-aircraft defences provide certain protected areas in which our aircraft can alight, and rest and refit between the battles of to-day and to-morrow. But neither the men-of-war, nor the aircraft, rely upon the guns of the port, nor those of the A.A., to keep them safe when on the move. They rely on their own weapons.

VI.

Future developments of the close support weapon.

It is suggested in Part I. of this article that the antidote is never very far behind the new invention. The pack howitzer was adopted for close support and anti-tank purposes because it was ready at hand, and both it and its organization had been thoroughly tested in warfare in mountainous and roadless countries such as India and Palestine, before post war problems began to be thought out. It is in fact a reasonable, if partial, solution of the problems caused by the increased resisting powers that weapons have given to the defence, and of those problems which face the infantry when placed on the defensive by the attack of enemy tanks. But if the antidote was good in 1918, it does not follow that it would be equally efficacious

[1] This is a theory that could easily be tested at Larkhill, real tanks being employed against dummy guns, and real guns against dummy tanks.

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in 1928. Colonel Fuller and other experts tell us that the deadliness and the powers of gas will be enormously increased in the next war, and we all know that the tank is only in the beginning of its development.

Gas and the tank are the two things that will most effect the future of the close support weapon, the former because it limits mobility and even capacity for movement, and the latter because it modifies offensive powers and general value. It is said that an efficient respirator has been devised for the use of animals, but I cannot think that mules would appreciate them very much, except as food, or would be able to pick their way over rough and difficult ground when so equipped; what is more, mustard gas and its future developments, will attack all parts of the body with a highly irritant effect, and to guard against this a complete overall would have to be placed over the animals bodies. With the men in their super respirators, the mules in their super overalls, the pack batteries of the future may still be able to hold their own, but they will certainly be heavily handicapped by the difficulties which they will have to face if the prophecies of chemists come true.

With regard to the tank, we know already that the tank of the next war will be a very different proposition from any produced in 1918. Some will probably be armoured, while all will have a speed approaching twenty miles an hour, and they will be freed from most of those mechanical defects which were in war their chief stumbling block. Vibration will be lessened, and their steadiness as gun platforms increased, with a consequent improvement in their shooting. The anti-tank and close support weapon will have to make a corresponding improvement to deal with the super tank of the future. It may be necessary to evolve a new weapon of the pom-pom type, with high velocity, and great rapidity of fire, purely and solely for anti-tank work, leaving the 3·7″ howitzer to perform close support duties only.

There is also another solution; supposing that "Design" could produce a mechanical tractor not more than 16 feet long, or above four feet off the ground, capable of moving at from 3 to 15 miles per hour, and having on it a gun platform carrying a shielded pivot in which the 3·7″ howitzer (that is the piece alone) could be mounted if required; also that this gun platform could be arranged so as to carry a crew of four, 100 rounds of ammunition, and the components of the howitzer carriage (that is the wheels, axle, carriage, pivot, buffer, shield, trails, and slipper) fastened around the bulwarks of the platform, so as to be out of the way and yet available in case of need. Supposing that the weight and width of such a tractor allowed it to pass over all ordinary bridges, and its handiness and power enabled it to cross all ground (except woods) which infantry can pass over without using their hands, and finally, that such a gun platform was capable of being gas proofed, then would not the 3·7″ howitzer, so installed, and followed by its ammunition tractor carrying five men, spare parts, and 150 rounds of ammunition, be a solution to our difficulties?

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As a close support weapon it would be more compact, faster, and have twice the ammunition supply at present available. If it was desired to withdraw the tractor, the gun could be assembled on its own carriage, and its ammunition could be dumped. Its visibility, when limbered up, would be largely mitigated by the pace with which it could move from one position to another, and it would have the supreme advantage of being still in action and able to fire even when on the move. As an anti-tank weapon the pivot would give it stability and make it quick firing, while the provision of a proportion of special anti-tank fixed ammunition, containing an increased amount of propellant, would turn the howitzer into a gun when so used.

It is suggested that it would be worth while to experiment on these lines, and that the mechanicalisation of close support artillery (disgusting as the idea is to all of us who love our horses and our mules) is an even more important consideration than that of the field artillery, and much easier to accomplish, since not only is "our gun made in two bits" but our carriage is also divisible, and no problem arises out of the width of the track.

The writer would like to close this article with a question. Assuming that the mechanicalisation of close support artillery does eventually take place and that, in the long run or the short, the horse artillery suffers the same fate, then what difference is there likely to be between the employment and tactics of the two senior arms of their respective branches of the Regiment?

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AN IMPERIAL WIRELESS SERVICE.

BY CAPTAIN M. N. T. GUBBINS, O.B.E., M.C., R.G.A.

(Continued).

THE article on this subject which appeared in the "R.A. Journal" in August having been written early in the year was not up-to-date. Wireless communications is a subject which is being developed rapidly, and in consequence every month sees further developments, alterations in policy, and Cabinet decisions.

It therefore seems essential to publish the further developments in this Journal, and to enumerate the decisions arrived at more recently which have been communicated in the official reports of Parliamentary debates during July.

The Government's policy in regard to Wireless Communications with the Empire was announced in March last. Since then two applications from private undertakings have been received—one from the Marconi Company for a general licence covering the whole of the British Empire, as well as foreign countries, and the other from the Eastern Telegraph Company for a license to erect stations for a service between India and Great Britain. The Eastern Telegraph Company made a similar application to the Government of India, who have not reached a decision. In the event of the Government of India granting to that Company a license for an Indian station, the arrangements to be made for the provision of the communicating station in Great Britain will be discussed with the Company.

As regards the contract which is to be made with the Marconi Company, the details of which are still being discussed, the following is an outline of the conditions which will be contained in the Agreement:—

The wireless telegraph services of the British Empire are to be conducted through stations provided by the Company and by the Government, respectively, in agreed proportions, the Company at the outset to provide two stations and the Government one station, apart from the existing stations at Leafield and Carnarvon. These stations would probably not be earmarked each to work with one dominion or in one direction, but there would be some flexible arrangement by which any number of them would work where they are most wanted at the time.[1] They will work with big stations in South America, etc., as well as with the Dominions. The stations are to be maintained at the cost of the parties providing them. The revenue of the stations is to be pooled and divided between the companies and the

[1] Although this arrangement would appear to be the most satisfactory, the Post Master General, in order to meet certain objections raised by the Marconi Company, has indicated that the Government would be prepared to divide the services on what he calls a "regional basis," so that the services for Canada and South Africa should be conducted by the Government station, whilst those for India and Australia should be conducted by the Marconi Company's station. (*The Times*, 17th October, 1923).

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Government in agreed proportions. The whole of the services are to be worked from the General Post Office by Government operators, and a proportionate part of the cost, including overhead charges, is to be charged against the company. The rates to be charged to the public are to be settled by mutual agreement. Whenever possible, the rates are to be less than the cable rates.

The Government retains the right to admit other parties to the pooling arrangement provided that they are able to provide a station of equal efficiency.

A site near Rugby has been secured for the Government station, and orders have already been placed for part of the plant required. Its erection will be pressed on as quickly as possible, but it may be twelve months before the station is ready, and the progress of the science may suggest alterations in design before this time has elapsed.

The site of the Marconi stations in Great Britain is not yet settled, but there will be a group of transmitting stations together in one area and a group of receiving stations together somewhere else, with telegraph stations connecting them.

The station in Australia is to be at Melbourne. In South Africa it is to be at Johannesburg, since the existing station at Windhuk is too far off and the telegraph connection with Cape Colony is too precarious.

The Marconi station in Canada is already at Montreal. The station in India is not settled yet, nor are the means of communication with Bagdad, Singapore and Hong Kong.

As regards New Zealand, this Dominion proposed a year ago to increase the power and range of the Auckland and Somoa stations so as to place her in touch with the whole world. The plan has not, however, been proceeded with pending settlement of the British policy. Now it appears, according to the Postmaster-General, that New Zealand may make her choice between direct communication with all parts of the world and communication through some other Empire station. She desires to assist the establishment of an Empire scheme, provided she is not asked to accept a Cinderella's portion in that scheme.

It seemed in July as if the question at issue had been settled in principle and that the licence would be granted to the Marconi Company in about a fortnight; but it now looks as if there is to be a still further delay before the scheme for an Imperial Wireless Service can be settled. In a recent article by the Daily Telegraph correspondent, confirmed in *The Times* by "A Wireless Expert", the announcement was made that the negotiations between the Post Office and the Marconi Company had reached a complete deadlock, and that there was not the slightest hope of anything practical being done before the meeting of the Imperial Conference in London.

The Marconi Company has never asked for an exclusive licence or a monopoly. It has expressed its willingness to face the competition of the subsidised services of the Post Office or of the services which the Post Office might licence any other private enterprise to undertake. But what no company could agree to is the pooling arrangement proposed, under which the company was to give to the

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Post Office the free use of the whole of its patents; the service to be run by Government officials without the company having any power to control the working of the service, and the company was to place at the disposal of the Post Office the stations which it is to erect in the different Dominions.

*The Marconi Company is most willing to carry the scheme through under the pooling arrangement if the operation of the stations were to be conducted by private enterprise and not by the Post Office. It hopes to be granted the licences to communicate with the Dominions on terms consistent with Mr. Bonar Law's policy declared last March, which entails free competition with the Post Office and with any other private enterprise the Post Office may license; it is prepared to face such competition, and as soon as a licence is granted by the Government on these terms it is prepared to proceed immediately with its scheme for Dominion and foreign communication.

In the article on this subject which appeared in the August number of this Journal, it was suggested that in view of the rapid strides being made by the French there is no time to be lost if we are to avoid being forestalled in the capture of the Pacific traffic.

France meanwhile has made great progress. A station has been completed which is sending news broadcast all over the world including Australia; and a company is now being formed in connection with Indo-China for communication between Europe and the Far East. This Agency would extend its concern to all matters relating to the Pacific. America has built an equally powerful station at Long Island which is transmitting news everywhere. Japan is closely studying the question. A station of world range has been opened at Buenos Ayres. Every European country has started stations for sending messages throughout Europe.

Whereas, the British Post Office has finished the Leafield station and the Cairo station. The Leafield station has sent out a foreign news service but it cannot reach the Dominions or India.

It undoubtedly is a serious matter that one of the Great Powers should already have obtained what almost amounts to a monopoly of wireless propaganda in the East. If the enterprise is not likely for some years to be a profitable one the Government should allow it to be undertaken by private enterprise, reserving to itself the right of purchase after a number of years as a safeguard.

The British Empire, spread over the seven seas should above all others be first in the field with a working system of wireless communication of world range, whereas it has apparently lost any chance in the near future of getting the supremacy of wireless in the Pacific, and it has lost its position in the Far East and in Europe.

It seems therefore that the problem which still remains to be settled is that of State control versus private enterprise. This is the situation with which the Imperial Premiers will have to deal.

* *The Times*, 10th October, 1923.

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SMOKE AS A WEAPON OF WAR.

BY MAJOR R. T. HOLLAND, D.S.O., M.C., R.F.A.
General Staff, A.H.Q.

Reprinted from "The Journal of the United Service Institution of India," July, 1923.

I.—Object of smoke.

IN spite of the fact that modern warfare has produced a great development in the use of night operations, it may still be taken as an axiom that man is by nature a day-moving animal. He prefers to fight his enemy in the light of day rather than in the dark. Daylight gives himself confidence and a feeling of superiority.

If, therefore, we can equip our fighting forces with a weapon, which produces conditions of night for the enemy while preserving conditions of day for ourselves, it will be conceded that we add a most powerful weapon to our armoury. Such conditions the *skilful* use of smoke can produce.

Field Service Regulations, Vol. II., crystallises the object of producing these conditions in the words "Smoke is used to obtain concealment either as a means of effecting surprise, or of reducing casualties." Sometimes we hide our own dispositions. Sometimes we blind the enemy. In all cases the smoke screen must be placed close to the object it is intended to hide or blind.

The skilled use of smoke is termed "Smoke Tactics" which Sir William Birdwood has described as "one of the most interesting means of securing that vital factor in war-surprise".[1] It will be generally admitted that surprise is a principle, which suffered much neglect during certain periods of the Great War, and which always handsomely repaid attention bestowed on it. It seems clear, therefore, that smoke as a weapon deserves the earnest consideration of sailors, soldiers and airmen, for these remarks apply equally to the three elements, in which warfare is now waged.

II.—History.

Smoke is by no means a new weapon. The earliest historical reference to it is probably the smoke screen, which protected the Israelites during their march from Egypt to the Promised Land (Exodus, xiv., 19).

In the civil war of the Roman Empire both Cæsar and Pompey used this weapon. In sea fights in those days the smoke galleys moved in advance to the windward quarter and emitted their cloud of smoke. When the enemy was blinded, the attacking ships moved up in daylight and fell on him. At the siege of Marseilles (about B.C. 50) Cæsar's troops used smoke to conceal the direction of the

[1] Foreword to "Smoke Tactics," by Lieut.-Colonel P. R. Worrall.

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assault with the result that the defenders could not concentrate. Cæsar and Pompey were also in the habit of blinding each other's archers by means of green wood smoke.

The Byzantians and at a latter period the Saracens employed this weapon. The former even manufactured a form of smoke bomb.

Then came the introduction of gunpowder. By the 15th century the smoke of black powder had begun to take charge of the atmosphere of battle-fields, and the deliberate use of controlled smoke was at a discount. The highlanders of Scotland continued to use it during the middle ages. Their method was to light the grass on the hillside in order to prevent observation of some locality or route. It is interesting to note that the highlanders of the Indian Frontier use the same methods to-day, and have before now surprised a piquet after smoking it by lighting the surrounding grass and scrub.

Throughout the 18th and 19th centuries the smoke of black powder continued both to make difficulties and give advantage on the battlefields of Europe. It will be remembered how at Waterloo the smoke cloud hanging in front of the British position hid the opposing forces from one another.

At sea too during this period the dense smoke cloud which hung round ships of war in a battle undoubtedly assisted the boarding operations, which were then in vogue.

As long as black powder held the field the use of controlled smoke was forgotten. When smokeless powder was introduced, the employment of controlled smoke still remained a forgotten art. Von der Goltz, writing in 1883, visualised the smokeless battle-field of the future—the increased importance of reconnaissance, the clearer view and grasp of the situation, which a commander would possess owing to the absence of smoke from gun and rifle. But Von der Goltz and other students of war of that period seem to have lacked the imagination to visualise the increased power in the hands of a commander who harnessed that same smoke to his own use, and so forced his enemy to fight in the dark.

In 1885 the French adopted a smokeless powder, and within a few years the propellants used by all the armies of Europe were smokeless. The smoke weapon was forgotten on land and sea. No mention of it is made in the histories of the South African War or the Russo-Japanese War. The word does not appear in our pre-war Field Service Regulations.

III.—The Great War—on Land.

Then came the Great War. The enormous casualties and the power of the machine gun caused men to think of new weapons and new methods. Imagination and inventive powers were quickened. Smoke re-appeared as a weapon by land and sea, and made its début in the air.

It was only employed on land to any extent in France and Italy, and to a minor degree in Palestine. The first use in the war was probably the lighting of a haystack north of the La Basseé Canal in October 1914, to cover the withdrawal of a company, which was in danger of being cut off.

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In the winter of 1914-15 experiments with smoke candles were made by the Indian Cavalry Corps, but as a recognised weapon smoke was not used on a large scale till the battle of Loos (September 1915). Here smoke candles were used alternatively with the gas to prolong the period of discharge. Two minutes before the infantry left the front line all gas was turned off and the smoke screen thickened. Smoke was also used from 2-inch mortars to cover a gap of 200 yards between the 7th and 9th Divisions. Loos gave smoke a bad name, since in several cases it caused loss of direction. It must be remembered that if smoke is generated by candles or other means in our own lines, the infantry start in smoke and not in daylight, as is the case with an artillery or rifle grenade smoke screen.

At the end of 1915 General Tudor, who became a prophet and preacher of smoke throughout the rest of the war, asked for smoke shell for artillery. Various suggestions for producing smoke were engaging the attention of the Ordnance Committee in England during 1916, and in November of that year smoke shell began to appear in France.

It was not, however, till the battle of Arras in April 1917, that 18-pr. smoke shell were included in the creeping barrage covering the infantry attack. This was done on the front of the 9th (Scottish) Division north of the River Scarpe. The attack was completely successful. Owing to the smoke screen casualties were few. It must always be remembered that however good a shot the man behind the rifle or machine gun may be, fire through smoke is unaimed fire, and unaimed fire is worthless.

There were two other interesting developments of smoke during this battle. The first was a distant 18-pr. smoke screen to prevent the enemy seeing our creeping barrage from his observation posts and thus realising that our attack had been launched. The second was the use of smoke to protect a flank. The 15th Division was attacking south of the Scarpe. Its attack was held up, thus exposing the right flank of the 9th Division to machine gun fire from across the river. A battery of the 9th Division blinded the enemy opposite the left of the 15th Division with smoke. This enabled the right of the 9th Division to press forward unscathed and by its advance to assist the 15th Division.

From this time onward smoke came into its own in France. Smoke shell were multiplied, the Tank Corps took up the question of protection by means of smoke, and smoke grenades for infantry were developed. The smoke grenade fired from a rifle proved a most useful platoon weapon, especially when the fighting began once more to partake of the nature of a war of movement. In such fighting the infantry found that they had again to rely on themselves to a great extent for covering fire, and the smoke grenade was a great help in overcoming "strong points" and obstinate machine guns.

The value of smoke for denying observation and screening a flank became thoroughly realised. At Cambrai on November 20th, 1917, we put down a smoke screen lasting four hours on the high ground, which overlooked the right of our attack. Ten days later the Germans used smoke effectually, when they made their counter-stroke in this area. On that day our 12th Division reported that

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owing to enemy smoke our reserves could not see enough to enable a counter-attack to be planned. On the same day smoke bombs from aeroplanes were used by the Germans.

Througout this period of the war skill in the use of smoke was exploited. Sometimes we provided a "mixed grill" of gas and smoke repeated on several occasions, and then one day varied the procedure by serving smoke only followed by an infantry attack. Such treatment is apt to impair a defender's equilibrium, and to direct his thoughts toward his respirator instead of his rifle. Smoke was largely used in feint atacks and in concealing the extent of front of attacks. It also proved its value for helping in the difficult operation of crossing a river in the face of an enemy.

When blinding observation posts and points of vantage, it must be remembered that, as it is necessary to put down smoke to windward, a minute or two will elapse before the smoke screen is formed, and therefore the screen must be started a minute or two before the time at which the enemy is to be blinded.

Though smoke was usually employed in the attack, there are several examples of its use in defence. A notable instance is the retirement of the Austrians across the Piave in June 1918. They had been caught in flank on the Montello by the Italians, and, disastrous as the withdrawal proved to be for the Austrians, their losses would have been far heavier, if they had not used smoke.

A good example of Australian initiative may be quoted. On September 29th 1918, the temporarily formed Australian-American Corps was given the task of forcing the Hindenburg line about Bellicourt. Two American divisions were in front, and the Australians preceded by tanks were to "leap frog" the Americans in the course of the attack. The leading divisions were held up, and most of the tanks, which were equipped with rifles and smoke grenades, were put out of action. The Australians then came up, took the smoke grenades out of the derelict tanks, and with the aid of these grenades were able to push on.

The following were considered to be the disadvantages of smoke on land as the result of experience during the war :—

(1). *The difficulty of keeping direction.*—This can be overcome to some extent by higher training, and, where suitable, by the use of guiding light signals.

(2). *Smoke draws fire on infantry.*—This was sometimes due to faulty smoke tactics. A smoke screen must always well overlap the object to be concealed, and must never be used to conceal halted troops from ground observation.

(3). *Smoke grenades are yet another weight for the infantryman to carry.*—This is a matter of policy. If smoke is worth its place, it must be carried somewhere, either on the man or in transport—at the expense of something else, if needs be. After our attack at Oppy in 1917, the men of one of our battalions were asked their opinion as to the advisability of carrying smoke grenades. Practically the whole battalion voted for two grenades per man.

(4). *With a flank wind smoke interferes with troops on a flank and obscures their targets.*—There was a case of this in the final advance in Flanders in 1918. One of our divisions was attacking

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under smoke. The smoke drifted on to the front of the adjoining division, which for a time found difficulty in keeping direction. The British, however, had the initiative, the artificial fog proved a greater handicap to the enemy, and the attack was entirely successful on the front of both divisions.

(5). *A change of wind upsets smoke plans.*—This point must be remembered in framing orders for an operation, and arrangements must be made for issuing such orders as "Fire no smoke," "Fire half smoke," etc., according to circumstances. Even if the wind is blowing straight towards the attackers, there is nothing to prevent a creeping smoke barrage being fired. It is only the location of the smoke screen, which must be changed.

Such are the disadvantages. On the other side of the balance must be placed the undoubted value of smoke during the war in aiding surprise and in saving casualties.

Time after time descriptions of battles have emphasised the help given by natural fog to that side, *which had the initiative*. The "luck" of the Germans in being favoured by fog both on March 21st and on April 9th, 1918, is common talk. Again, the British were only able to continue the construction of a bridge across the Piave in October, 1918, *because* there was a fog.

General Montgomery brings out two striking examples, when describing the storming of the Hindenburg line on September 29th, 1918, in his book. "The Story of the Fourth Army". "By this time the dense mist, which had greatly assisted the attack of the 46th Division in its early stages, had thinned considerably, and the visibility was much improved. This enabled the enemy to bring effective fire to bear on our troops, and made the tanks an easy mark for hostile field guns" (p.159). Then later "The mist now lifted, exposing the infantry and tanks to the view of the enemy holding the high ground round Nauroy, and the anti-tank guns concealed in the village quickly put the tanks out of action" (p.164).

The following extract from the official report of the operations of the Third Army in France on August 21st, 1918, exemplifies the value of smoke or fog and also one of its inherent disadvantages:— "The mist was useful in the early stages in screening the tanks, though it was with the utmost difficulty that they maintained direction. The mist lifted about 10 a.m.—a most critical time . . . . Had the mist lasted half-an-hour longer, the tanks would have been across the railway and behind the gun positions. As it was, they suffered several casualties from artillery fire".

These examples show the value attributed to natural fog. If smoke is deliberately used as a weapon when and where it is required in the place of this uncontrolled fog, its value must surely be immeasurably greater.

In Eastern countries the dust caused by movement and projectiles is somewhat analogous to the unharnessed smoke of black powder days during a great part of the year. There is, however, great scope for the use of smoke in dusty countries for such purposes as blinding observation posts, screening a flank, feints in a river crossing, etc. Smoke, too, has hitherto untried possibilities in mountain warfare.

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IV.—The Great War—at Sea and in the Air.

Meanwhile the use of smoke had developed enormously at sea. The Germans employed it in the "running" phases of their "tip and run" raids on the east coast of England. Our sailors adopted generators on board ship (often special boats for the purpose) or smoke boxes thrown over board. At the end of 1916 smoke generators were issued to merchant ships as part of their anti-submarine defence. The ability of ships to manœuvre in any direction facilitates various means of laying smoke screens according to the wind.

Smoke certainly became one of the dominating factors in the plan for blocking Zeebrugge. An earlier scheme for the operation had been worked out by Admiral Bacon and abandoned "chiefly on account of the difficulty of getting a good smoke screen." During the preparation for this great adventure a special factory was established at Dover under Wing Commander Brock, R.A.F. (a son of the Brock firework fame). The main activity of this factory was the development of smoke methods, and it is recorded that one of the experiments produced a thick fog in the Straits, which lasted three days much to the discomfiture of the shipping in those parts. During this period the first experiments were made in artificial clouds generated in an aeroplane to afford concealment from ground observation.

The Zeebrugge operation was carried out on the night 22nd—23rd April 1918. There were 21 miles of coast on which were mounted German batteries, which could fire on our ships. On the whole of this stretch of 21 miles we put down a smoke screen produced by generators on a host of motor launches. As a result a dense "pea soup" fog was added to the darkness of the night.

Smoke tactics now form an indissoluble part of modern naval tactics. The naval side of the subject must be studied by soldiers not only because each service should watch the evolution of the other with a view to fostering a more intelligent co-operation, but also because we must realise that as tanks develop and form a larger proportion of our land forces, so the tactics of this proportion will more and more approximate to naval tactics.

V.—Smoke-producers.

By the end of the Great War the following different methods of producing smoke had been evolved :—

(*a*). *At Sea*—
- Smoke generators on ships or special smoke boats.
- Smoke buoys thrown overboard.
- Smoke from funnels by generating smoke in the furnaces.
- Smoke generators on kites towed by destroyers to make a ceiling of smoke over ships.

(*b*). *On Land*—
- Smoke generators actuated by hand.
- Smoke candles or cases.
- Hand grenades.
- Rifle grenades.
- Mortar bombs.
- Smoke shell of various calibres.

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Smoke from tanks—

(i) by "projection" from guns or rifle grenades;

(ii) by "diffusion" generating smoke in the exhaust;

Improvised methods such as burning red phosphorus in the open, setting fire to straw tightly packed in sacks or damp hay, tar barrels, green wood, etc.

(c) *In the Air*—

Smoke bombs dropped to the ground.

Smoke clouds generated in the air for self-concealment.

The advantages and disadvantages of these various methods must be shortly reviewed.

At sea, smoke generators and buoys thrown overboard have proved their worth as the best means.

Smoke generators and candles as land weapons are clumsy and heavy and can only form a screen close to the smoke-producing agency. The same may be said of the hand grenade. The rifle grenade is undoubtedly the best infantry smoke producer.

Smoke shell for artillery have come to stay. The light howitzer proved its superiority to the light gun weight for weight for blinding work. The light gun is required when smoke is included in creeping barrages to conceal our own infantry in the attack.

As regards tanks, "projected" smoke from guns and rifle grenades proved successful, especially from rifle grenades. "Diffused" smoke from the exhaust could probably best be used in the protection of other tanks. The leading tanks can manœuvre into the wind, project smoke to protect themselves, and then diffuse smoke to cover the remaining tanks following them. "Tank Training" emphasises the use of diffused smoke in a withdrawal.

As regards the air, smoke bombs from aeroplanes will certainly be further developed. On September 18th, 1918, on the front of our Fourth Army, arrangements were made for aeroplanes to co-operate with the tanks in masking anti-tank guns with smoke bombs. This method may also be used to supplement the artillery in blinding distant observation posts. The artificial cloud produced by an aeroplane in the air for self-concealment is still in its infancy.

VI.—After-war Training Manuals.

It is interesting to compare the treatment of smoke in our various after-war training manuals. Field Service Regulations, Vol. II., is suitably balanced on the subject, lays down the uses of smoke, and sees more scope for it in attack than defence. The word "smoke" does not appear in either Cavalry Training or Machine Gun Training. Infantry Training and Tank Training both welcome this weapon with enthusiasm, but Artillery Training is luke-warm on the subject. The latter book points out that smoke interferes with counter-battery work and impedes observation generally, that it diverts some guns from their primary task of man-killing, that is may blind friendly troops on the flank, and so on. Artillery certainly has much to lose from an *indiscriminate* use of smoke—especially in moving warfare. As regards man-killing, it is of interest to note that the 9th (Scottish) Division in their successful attack east of Ypres on September 28th,

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1918, fired two smoke shell to one H.E. shell in spite of a density of only one 18-pr. per 40 yards of front in their supporting artillery. The object of covering fire (whether provided by artillery or infantry) is to enable the attackers to get home. If smoke fulfils this object, its effectiveness as covering fire cannot be gainsaid, though it is not directly a man-killing agency.

The proportion of smoke to be carried by different arms—infantry, artillery, tanks and perhaps cavalry—requires careful consideration. When weather conditions and the direction of the wind are unfavourable, a large number of shell are required, if artillery is to make an effective screen. Terrain and climate largely affect the question. If a basic minimum is fixed for the various echelons in the chain of supply, the total proportion of smoke required for any given operation must be decided on the factors in each particular case.

VII.—Need of Development.

This outline of the development of smoke brings out something of what smoke has achieved, and some of its disadvantages. This weapon must now definitely take its place alongside the many other weapons of modern war.

Smoke must be developed to help us to a greater superiority over the tribesmen on the Indian frontier. In the withdrawal of a piquet smoke could be put down in or in front of the piquet. Sometimes we could withdraw at once under cover of the smoke; at other times we could wait and fall on the enemy, when he thought the coast was clear. Smoke tactics could also be employed in the consolidation of piquet positions—an operation which caused much trouble to General Skeen's column in 1919—and in many other problems of mountain warfare.

It must be remembered that most of the enemy rifle fire on the frontier is individual aimed fire, and that smoke makes fire unaimed. The rifle grenade has great possibilities as a smoke-producer in mountain warfare. Transport is of course always a limiting factor in mountainous country, but where ammunition is limited there is much truth in the statement that "the experienced commander would prefer, every time he was called upon to launch his tanks and infantry to the assault, a little smoke to a little shrapnel or H.E."[1]

The possibilities of smoke have not yet been fully developed. Its tactical employment must be further studied. As with every other weapon, it cannot be used to the best advantage without a high standard of training. The gunner must know the right place to put his shell in every wind, the probable direction of draughts in the hills at the different times of day, and so on. Infantry must be trained in "fire, smoke and movement" instead of the old "Fire and movement." Finally the chemists and manufacturers must strive for improved designs—especially suitable smoke-producers for tropical climates.

[1] "Tank Minor Tactics," by Lieut.-Col. W. D. Croft—Army Quarterly, April, 1923.

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We must not wait till war comes, and then improvise tactics, training, design, transport and allocation in the chain of supply of adequate reserves. If war comes, and finds us not prepared to give to smoke its proper place in our armoury, we shall be failing to employ all the resources of the State and exposing our man-power to needless casualties.

NOTE.—The following books have been consulted. They are all of great interest regarding the subject. The information in the last-named book has been largely drawn upon in parts of this article.

"History of the 9th (Scottish) Division"—Ewing (1921).
"The Blocking of Zeebrugge"—Carpenter (1921).
"The Dover Patrol, 1915-17"—Bacon (? date).
"The Story of the Fourth Army"—Montgomery (1919).
"Smoke Tactics"—Worrall (1919).

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MODERN WAR AND MACHINES.

BY GENERAL DEBENEY.
Director of the Ecole Superieure de Guerre.

Extracted from the Field Artillery Journal, May-June, 1923, being a translation of an article appearing in the *Révue de la Semaine*, February 10, 1922, by Captain Paul C. Harper, Field Artillery, American Army.

(Continued).

"IF you wish peace, prepare for war," is an old adage. But it is for the war of machines that we must prepare to-day, a preparation which means nothing less than organising that immense arsenal, the entire country, on the one hand, and utilizing the entire population for the defence on the other hand.

It is no longer a question of merely calling to arms a certain part of the population such as the men from twenty to thirty years of age as we did in 1914. We must anticipate the mobilization of all the activities in the country, of all the material resources and of all individuals according to their occupations. It will be necessary to add to the mobilization of troops with which we are already familiar an industrial mobilization to supply, repair and increase the armament of war, an economic mobilization to ensure the continued functioning of the country as well as the army, a mobilization of administrations of all kinds to conduct the regular government of the nation during war time, and finally a mobilization of our North Africa and our other colonies which have proved themselves to be integral parts of France. Thus we shall be assured of a proper functioning of the nation at war, an indispensable condition if we are to make use of our national resources at maximum efficiency.

At it is of the utmost importance that all these simultaneous mobilizations be effected calmly and quickly, the preparations should be very thorough and foreseen in every detail. The necessity is not only one of technic but also of morale. No one can forget the inspiring spectacle of our mobilization in 1914. The impression of power and confidence which it gave out is certainly one of the elements which enabled the army to stand without weakening the reverses that came at the beginning of the campaign and enabled the country to await calmly the turning of the tide at the Marne. The experience of 1914 proves that we can organise a general mobilization of the nation in as thoroughly efficient a manner as possible. It it no less certain that we shall be able to repeat this success on one condition only—and that condition is indispensable—that our mobilization be protected, that is, that we have a covering force.

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The problem of the covering force is intimately related with that of the preparation itself. The transition from peace footing to war footing is always a delicate operation and especially so when the organisation is so large and complex. The general mobilization of the country, such as is required by the war of machines, will take a long and critical period during which the covering will be a vital question whose solution is one of the first duties of our military institutions. The covering is truly a question of principle.

This principle, so obvious to us, is far from being so well understood by other countries. Its denial, or simply a misconception of it, is at the bottom of all controversies over the reduction of armies that have taken place at London as well as Washington and other places. It is generally admitted that each country has the right to prepare for its defence according to the exigencies of the situation and its own political customs. Most people are willing to classify these exigencies under the head of the domestic politics of the country and to refrain from passing judgement on them. But as the required covering for mobilization differs in different countries some people think that they can bring questions of foreign politics into the matter and accuse us of imperialism. This belief is sincere, we think, and the grounds for it are very simple. People only understand what they see and experience themselves and the viewpoint of each of the allies is fixed by one particular case, its own, which is entirely different from that of its friend, especially when the friend is not an immediate neighbour

In the case of a nation like the United States which is separated from possible adversaries by oceans several thousand miles wide and which has moreover a powerful navy in reserve to block the avenues of access to her coasts, a delay of entire months can be counted on for general mobilization. Her covering is completely assured by the ocean and her navy. It is almost useless for her to have a standing army.

England is separated from the continent by seas controlled by her powerful navy and her danger is no more immediate than that of America. However, the narrower bodies of water are not the obstacles that oceans are and some new invention might neutralize them momentarily since aviation has so greatly widened its field of action. Therefore, although not in months, England can still count on a delay in weeks which will permit her to get on a war footing. Powerful as it is, her navy is an insufficent covering force in itself, so a permanent army is a necessity to her. It can be a modest one, nevertheless, a regular army without universal service.

Italy has a frontier protected by high mountains, but this is a very precarious defence. Roads and paths across the mountains and aviation is developing more every day. Italy can count on a delay of days only and cannot content herself with a regular army to cover her mobilization.

And then consider France. Where are the oceans, the seas or even the mountains that will procure her the time indispensable for putting herself in a state of defence? She lies in immediate contact with her traditional enemy. The delays at her disposition must be counted in

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hours, not days. What, then, is the covering force on which France must rely?

An alliance? Actually alliances are not adequate protection. At the very first they discourage aggression by threatening dire consequences of any violence done and later they bring relief in the shape of powerful fleets and armies. God knows, alliances are valuable! But the fact remains that the preventive power of a threat is a problematical support and what we have got to have is protection on the day, even on the hour, and not on the morrow. That protection we alone can supply by means of a strong army and navy.

Belgium is in the same situation as France. Like her neighbour she has no natural protection and through bitter experience she has learned the brutal lesson of the value of treaties as a protection. She has not hesitated to rebuild her traditional institutions and make her own protection, in the shape of a permanent army, behind the cover of which she can pass from a peace to a war footing.

For nations in as exposed positions as France and Belgium the element of protection is entertwined with the time element, and we have a greater appreciation of the importance of the time element than anyone else. Several times during the war we had occasion to calculate very closely the delays necessary to complete the military preparations of other allied nations, to equip them for modern war and get them into the battle line. We can well remember how, as interested spectators, we counted the days and we knew what time was worth.

The reasons that compel France to maintain a strong permanent army are the necessity for furnishing the cadres for a general mobilization of the country and the necessity for protecting this tremendous operation. This army must necessarily be large because when time is lacking the two duties are inseparable. If the covering force is inadequate the enemy's troops, aviation and navy will arrive in the midst of our mobilization and all our preparations will have been for nothing. If the preparation does not include in time of peace all those organisations which it will be necessary to place quickly on a war footing, all the human, economic, industrial and agricultural resources of the nation, the accomplishment will take too long and the covering force will be crushed before the mobilization becomes effective.

It is the essence of the war of machines to unite the organs of protection with the organs of the general mobilization. The advantage is sometimes discussed of having a regular army equipped with a very formidable armament under the protection of which it would be possible to organise a levy *en masse*. Aside from the fact that an army such as this would cost too much for the maintenance of its effectives alone, to keep up its matériel in step with the constant progress of industry would be ruinous to the nation and otherwise there would be the risk of its being caught by war with an antiquated armament. Behind the imposing facade of such a system there would be a great probability that the machinery for raising the levy *en masse* would rust and that the preparation would gradually become a paper preparation. Moreover, experience has shown this to be true.

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In 1867 Marshal Niel organised the national guard behind a regular army, but we know that the regular army was crushed before the guard had time to pass from paper to reality and the spectacle ended in tragedy. Between the covering force and the machinery of mobilization there must be more than a close liaison, there must be an identity of nature which will permit a constant interchange of elements so that normal life can continue, so that the regular pulse of the army will control the efforts of the nation and so that the progress of the nation can supplement the efforts of the army.

The army of universal service is an army capable of furnishing at the same time the machinery for a general mobilization of the country and a covering force as well. It has certain active elements, thoroughly trained in time of peace, which can absorb and co-ordinate all the forces of the nation in their particular capacities so as to make certain an orderly and efficent mobilization. It is possible that a regular army might furnish as solid protection, but it would encounter greater difficulties, to say at least, in making secure behind it the general mobilization of the country.It is possible that a militia army might be able to manage the organisation of the country in a satisfactory manner, but it would certainly be incapable of protecting itself also at the same time. The army of universal service alone is capable of solving all the problems of organization imposed by the war of machines

To say to Frenchmen that universal service is the modern form of an army is to make them understand in one word the solution of the problem and, at the same time, assure them that there is nothing to fear from the war of machines, terrifying as it appears to be, because no other country, except perhaps Germany, has the principle of universal service more in its blood than France. During the fifty years that the institution has existed it has permeated our customs and habits to an extent which we do not realise. A superficial view reduces military service to the presence of citizens in barracks for one, two or three years and later to encampments of a month or a week. In reality the service has many other obligations which have become so customary that they are not perceived but they will have the effect of making easy the general mobilization necessitated by modern war.

Every French citizen makes a declaration and registers for possible requisition any property he may have such as a pure bred horse or a pedigreed percheron, all wagons and carts and all automobiles and trucks. This obligation has never met with difficulties nor will a similar registration of machines, turbines and even factories be difficult. Before the war there was a department of subsistence mobilization in every county and all mills, supplies of grain and herds of cattle were registered and allotted beforehand to the service of supply. Through the entire war this service functioned admirably and its organisation even served as a model for all the similar services that were organised under the pressure of events to exploit the various resources of the country. The obligations to which the farmers submitted in peace time were no added burden in war and the same thing would be true of the mitallurgists, the chemists, the weavers and the opticians.

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Everyone understood the necessity during the war of having bread tickets, sugar tickets and coal tickets and no one should be surprised to see these devices put into use on the first day of the next war. It would be much more satisfactory to do this because a rationing of supplies installed thoroughly and efficiently at the very first would be much less severe than if suddenly imposed at the moment when supplies were almost exhausted.

In this way the nation will find itself ready, as a natural result of universal service, to defend itself successfully when the war of machines breaks out again. At the proper moment everyone will go to his post. There will be thoroughly trained cadres ready to coordinate all efforts and give them definite form and while the great economic, industrial and military mobilization is being developed a covering army will be on guard at the frontiers. Behind its machine guns, its field guns, its aviation and all its modern armament an atmosphere of order and confidence will be assured enabling the great French power to unfold itself unhindered. Guarded by its warships the flow of men and supplies will be established which overseas France will send to support the home land. The country will be ready.

Thus after cheerfully carrying for fifty years their patriotic burden, the people of France will receive the remarkable benefit of being able to adapt themselves without effort to the exigencies of the modern war of machines. We may well be envied this privileged situation, but it should be recognized that we had earned it by a long period of toil, by self-denial and by bloody sacrifices. France deserves to have the power she holds.

What particular form to give that power is a question for parliament to determine, but public opinion has a good deal of weight in deciding the nature of the foundations on which our reorganised military institutions shall rest. While lightening the burdens of the country as far as is reasonable after a victorious war, the new plans will provide for a general mobilization of all the resources of the country behind an adequate covering force and this double rôle will be played by universal service.

Universal service is the foundation of every French tradition. In the hour of every great crisis the safety of the country has been assured by an appeal to the entire people. When Louis le Gros raised the standard of St. Denis and gathered the communal militia on the field of battle of Bouvines; when the Convention decreed the levy *en masse* and threw out thirteen armies to the frontiers of the Republic; when Jean d'Arc fought before Orleans; Villars before Denain, and Gambetta after Sedan they all saved the day by calling on the entire nation. We all realise it, we who lived through those four years in which the traditional French spirit rose to its highest level; begun by men of twenty to thirty years of age this war ended when everyone, without exception, men, women and children, made their contributions to the battle and then to the victory.

We are all pulling together and we can regard the future with tranquil confidence.

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GENERAL SIR HENRY SCLATER, G.C.B., G.B.E.

AN APPRECIATION.

HARRY SCLATER, for it was thus he was known by all his friends, dated his commission from January 1875, and joined a field battery in Ireland; a little later he was with it at Aldershot, and alert, smart and keen, he soon attracted the attention of the leading gunners there and especially that of James Alleyne, subsequently Major-General Sir James Alleyne, one of Wolseley's men, and amongst the best trainers of troops that ever trod the Long Valley. There too he served in the then depôt of 'C' Brigade, R.H.A., and made a reputation as a good soldier. From the first he had taken his profession very seriously, and his ambition of course was to see service. In 1881 when Lord Roberts was sent to S. Africa to assume command of the operations against the Boers, he was selected for employment and sailed for the war. But our surrender after Majuba brought an unexpected peace, and Sclater and Lord Roberts were recalled without seeing a shot fired.

Sclater next was found in 'B' Battery, R.H.A., at Exeter, and there as elsewhere he became most popular not only with his brother officers but in the country houses of Devonshire. His winning, honest face and fine figure captivated all, and the writer remembers a west country sportsman telling him that "it was worth going to a military tournament to see Sclater in his jacket." The war in Egypt of 1882 came upon us suddenly that summer, and Sclater was once more disappointed. He was ordered on service, but Wolseley's masterly stroke at Tel-el-Kebir, so quickly finished the war, that the young fire eater got no further than Cyprus, whence he was recalled.

On promotion he of course left the R.H.A., and was ordered to a battery in Egypt, whence he at length got employed as a staff officer in the Sudan expedition of 1884-85, and gained a brevet majority. In the following year he was employed again in the Sudan, and was present at the action of Giniss as D.A.A. and Q.M.G., with the Frontier Field Force. He remained in Egypt as D.A.A.G., headquarters till February, 1890, and subsequently was in command of a field battery at Aldershot and Woolwich.

But he did not long remain at regimental duty, for in 1892 Lord Wolseley brought him as D.A.A.G., R.A. to his headquarters at the Royal Hospital, Dublin. There he served till 1895, when Lord Wolseley became Commander-in-Chief of the Army and took him to the War Office as D.A.I.G.O. How distasteful that appointment must have been to one of his tastes and temperament may be imagined, and when his old friend Colonel George Marshall obtained the command of the artillery at Aldershot at the end of 1898, Sclater gladly became his brigade major. But with all his industry and the able way he had served the most distinguished soldiers of the day, he was still only a major at the age of 43.

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Then the tide turned. In August, 1899, there was a great concentration of batteries on Salisbury Plain, and General Marshall and his Brigade Major held artillery exercises. The talk was of a coming war in South Africa, but it might all fizzle out, and in any case only a few lucky batteries would in all probability be sent. The end of two months saw the South African field force struggling almost for existence with an ubiquitous foe who outgunned us. It is unnecessary to recall those days, but Lord Roberts, Marshall and Sclater, and half the manhood of England were soon hurrying to the rescue. By January, 1901, we had muddled through. The war, as a war, was over, Lord Roberts went home, and many others including General Marshall accompanied him, while Sclater, with an immensely-enhanced reputation, was left as artillery adviser to Lord Kitchener, who we may be sure had noted him in Egypt.

From that day till the war ended Sclater ran the artillery in South Africa, and ably filled a most delicate and difficult position. At one and the same time he had to satisfy and carry out the wishes of a man who often demanded the impossible, and yet had to avoid offending regimental commanders of artillery who were senior to himself. But he did it, and made himself liked by the gunners, and indispensable to the great Lord Kitchener. Always in deadly earnest, asking much from others, and unsparing to himself, Sclater was never inconsiderate, and never forgot a friend.

And when the Boer guns had been driven from the field, he turned his comrades into mounted rifles, and enabled them to add fresh laurels to their wreath. A very distinguished general writes "I had a good deal to do with him at this period and I can testify to his earnestness and his whole hearted consideration for the old regiment, and their welfare was always in his mind. There is no doubt that his character impressed itself on Lord Kitchener, for although a devoted servant, he had no compunction in pointing out objections which Lord Kitchener had overlooked." Thus Harry Sclater as he was still to everyone, left South Africa esteemed and trusted by Kitchener, and popular with all who had been associated with him. For his services he received a brevet colonelcy.

From South Africa he again went to the W.O. as deputy director general of ordnance, at the instance of Lord Roberts, now Commander-in-Chief. His friends knew well that if he had been a mere selfseeker he would have endeavoured to obtain an active command. Let us, however, consider the circumstances prevailing in Pall Mall at the close of the Boer War. The whole machinery, tactics, and armament of our army were in the melting pot. The staff arrangements from top to bottom were being submitted to vigorous examination, every arm was being newly equipped, and the re-armament of the artillery, and its training demanded more attention than that of any other arm. During the whole war Sclater had been receiving and collating reports on the matériel in use, and for the last two years he had been mainly responsible for the manner in which guns had been utilised. In 1902 there was no one who had had so much experience or who knew so completely the deficiencies, and the sugges-

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tions for improvement which war had revealed. At such a moment could he with any sense of duty have failed to give his assistance to his old chief Lord Roberts in the huge task of reform that lay before him? Sclater's presence at headquarters was in fact invaluable to the army and to his country. The training of a few attenuated battalions could well be accomplished without serious risk to army efficiency by any officer of average ability. As usual Sclater followed the path of duty and for two years grappled with one of the biggest military problems of the day.

At the same time our best officers were similarly engaged, and Field Marshal Earl Haig was writing the new "Cavalry Training," working at the re-armament of cavalry, and commanding the 17th Lancers. In fact it was in those two years that the foundations were laid on which the efficiency of our army was subsequently built. Two years steady grind did much, but Sclater had by no means finished his task when suddenly he was carried off to another sphere of activity altogether.

In 1902, Lord Kitchener had gone to India as Commander-in-Chief and he now greatly desired Sclater to join him out there as Quarter Master General. Now Sclater had never been in India in his life, and the responsibilities of the Quarter Master General extend over a far more extended and varied field in that region than at home. Camping grounds, cantonments, the mysteries of the "native establishments," the feeding of native regiments, represent only a few of the peculiarities of Indian army administration strange and surprising to any one brought into contact with them for the first time. To guide others such a man would have first to educate himself. It was characteristic of Lord Kitchener that he selected an inexperienced officer to fill a post demanding highly specialized knowledge, but it is to be remembered that Lord Kitchener wished for Sclater's help not only as Quarter Master General, although the department of that officer would be greatly concerned, but also to help him generally in his great scheme for the reorganization of the army in India. That he selected Sclater for the job, was certainly the highest compliment that officer ever received. And things, thanks to Sclater's untiring zeal and tact, went quite well, and Lord Kitchener's statue at Calcutta, raised to his memory on his leaving the country, commemorates an unusually long and successful reign.—Nevertheless the position was a trying one for the Quarter Master General, and the same distinguished general who has already been quoted, writes that when he met him in Calcutta in 1906, he gathered that his old friend and comrade felt the strain a good deal, and would be glad to be appointed to the command of a division.

In due time the Lucknow division fell to his command, and he was transferred in 1909 to Quetta, where he commanded until his return to England in 1912. At Quetta, where a good climate favours the training of troops, the new divisional commander shaking off his fetters was well and happy. The Indian staff college lay beside him, and there he encountered some of the best brains in our army, and many a notable man. The writer of these lines now often heard from

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his old friend, who begged him to keep him posted up in what was doing in the army at home in letters that bore marked evidence of an earnest desire to keep himself abreast of our military progress and to train the units under his command on the same lines. The ordnance department and the office at Simla had faded out of sight, but the same relentless energy concentrated his thoughts on field service.

In the subsequent period of unemployment—like his chief, Lord Kitchener—he took up flowers and shrubs, and a beautiful home on the borders of Kent and Sussex bears witness to his ability as a landscape gardener. He played lawn tennis well also, and as an exponent of the dignified style of English skating he was unsurpassed. It is perhaps not out of place to mention that the hospitality of Sir Henry and Lady Sclater at Lucknow and Quetta, is still remembered. What Lady Sclater did in her gracious way to help her husband in the social side of his duty has been described as unique, and her house was a home to all who cared to come. To Holmwood too, many an officer returning from India turned his steps, and there a warm welcome always awaited an old friend.

A year or two had scarcely flown, when a storm more remarkable and unexpected than almost any in the records of our army burst on us early in 1914. Politicians determined to coerce Ulster, and their scheme was rudely shattered by the refusal of some officers and men in the provinces, and many of the leading officers at headquarters to be made parties to a base betrayal. But if the tempest had taken us by surprise, what supervened was in strict accordance with custom. Recriminations, prevarications, explanations, followed one another fast; then the scapegoats were duly found, and a secretary of state, a chief of the general staff, and an adjutant general were sacrificed.

Sclater was called suddenly from his rest to fill the last named post. The first artillery officer ever called upon to fill it, and to fill it at a moment of unexampled difficulty, for the great war burst upon us the following August, and the problems as regards army administration, stupendous of necessity, were doubly so, because we swapped horses in mid-stream. Lord Kitchener, now sprang into the secretary of state's chair, and probably the only leading men with whom he was personally acquainted in the War Office, were, Sir John Cowans—the quarter master general—and Sclater, both of whom had served him at Simla. Now, Lord Kitchener was one who trusted greatly to his own brain power and his own methods. The giant, like most giants, was irregularly great, and did not always know how to utilize the assistance which a staff carefully organized and distributed can give. Sclater had a task flung at him in the early days of the war, which few men could have faced. As usual, he threw his last ounce of strength into the effort. He guided Kitchener's headstrong spirit as far as he could, and he once more gained his confidence and regard. Lord Long, has told us, how, when he broke the news to the secretary of state, that Sclater's health had given way, our strongest soldier exhibited consternation.

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A G.C.B.. and the Southern Command, were the recognition given for services so strenuous and valuable, and in 1916, Sclater, as a Lieutenant-General went to Salisbury, steadfast and serene, and eager to do all he could to train the units he had assisted to create. The past two years, spent in close association with Lord Kitchener, had made him familiar with his methods and aims, and he was determined to be ready to time with any scheme that emanated from him. His former military Secretary—an officer much distinguished at Ladysmith—reminds the writer, that in those full days, the Southern command included such widely separated places as Penzance and Nuneaton, and stretched from Basingstoke to Gloucester. In that wide area, every important training centre was now visited two, three, or four times a year, as the nature of training in each required. Every day saw the C.-in-C. in his motor car on some tour or another, and it was only in it that he had time to glance at private correspondence. Reports and interviews filled up the few hours spent at home. He looked into everything himself with meticulous care. Rest there was none. A four days holiday in April, 1918, was all he would allow himself, and his recreation consisted chiefly in entertaining the senior officers visiting the command, and any gunner from the front who would stay the night and tell him his experiences.

In 1919, he was promoted general and received the G.B.E. in recognition of his work.

Such, from his youth onwards was the man, thus he bore himself, and thus he sacrificed himself. For big, strong, and brave, as he was, his spirit wore his body down, and he lived for only four years more to enjoy his honours, and devote himself to the cause of the British soldier left derelict where the storm of war had blown him. By his good work then he is widely remembered, and his helping hand will be missed by many an institution for the relief of distress.

A plain tale of strenuous life, of promotion, honours, and comparatively early death is here set down. What boots it to link together a series of dry facts and dates and memoranda that can be gathered from an army list or other book of reference? Why this, that, it is always worth while to remind comrades of a remarkable life and place it in bird's eye view before them. But in this particular case, it is of special value to recall the story. Even a brief study of such a career as Sir Henry Sclater's, furnishes a special example and incentive to all young officers joining the regiment which he loved. Appreciations, such as this, should not bespatter their subject with the indiscriminate praise of an old fashioned epitaph. An effort to set him forth as he really was, enhances rather than diminishes the value of his life's achievement. Sir Henry Sclater was not born with exceptional brain power, nor was he beyond the common run of men in any of his natural gifts. To do as well as he did, and leave so great a reputation is not beyond the powers of any intelligent, well-educated officer with grit to persevere. How far may not integrity carry a man? It was that fundamental virtue that sustained Sclater. He sought his own advancement less than that of those he served, and he gave his whole energy, time and mind to the task in hand. This is not to say that he had not remarkable qualities and a person-

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ality all his own. His early career was marked by disappointments. No special luck, nor social interest helped him on. But when he got a chance, he was able to make the most of it, and he served the ablest and most exacting leaders with uniform success. Lord Wolseley, ever friendly to men of promise, was a keen judge of character, and would not tolerate incompetence for a moment. Lord Roberts with all his geniality collected only able men about him. Sir Evelyn Wood, had a very high standard for himself and demanded it from those he favoured. Lord Kitchener, asked much from everyone who served him. All these generals tried Sclater in the furnace, and all helped him forward, while in Lord Kitchener, he inspired gratitude and friendship, as well as approval. It is only men gifted with genius, as well as other qualities, who can hope to rise to the topmost rung of the ladder, and if Sclater was akin to Berthier rather than Napoleon, to Sir George Murray rather than Wellington, surely to go as far as he did may satisfy the ambition of a young officer.

The very greatest are born great, no education, no industrious plodding will generate the pinion on which a very few may soar above their fellows. A youth may well be chilled by the aspect of the highest peak. But every purposeful officer will be encouraged to make sustained effort when he perceives how in the long run character, singleness of aim, discrimination, and industry will carry their possessors further than will more brilliant gifts unaccompanied by solid qualities.

It was the former characteristics that especially distinguished Sir Henry Sclater and have made him memorable, not only as a credit to the Regiment which brought him up, but as an example for those who follow after, and as regards the future we may be confident that if we produce more Sclaters we may hope to find more Wellingtons.

E.S.M.

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ANTI-AIRCRAFT ARTILLERY,
Its Capabilities and Its Limitations.

A Lecture delivered at the Royal Artillery Institution, Tuesday, 23rd October, 1923.

By COLONEL H. W. HILL, C.M.G., D.S.O., R.A.

Major-General C. C. Van Straubenzee, C.B., C.M.G., in the Chair.

CHAIRMAN: Gentlemen. Thirty years ago when I was quartered at Woolwich as a Subaltern, I remember I used to be pulled out of the R.A. Mess to come round here and sit on the back benches of this theatre to listen to a lecture on a subject about which I took very little interest. I suppose the same sort of thing is still going on but I am glad to see such a good proportion of subalterns here present to-night. At any rate the scene has not changed at all. We have the old Institution and we have the Committee of the Institution dispensing hospitality in the shape of afternoon tea. I suppose this is an added inducement to the Subalterns to attend, and I should like to place on record that I do not think the cakes are any staler than they were 30 years ago.

It is a very great pleasure to me to be here to-night among my brother officers, and it is also a gratification to me to preside at a lecture dealing with an artillery subject. In Colonel Hill, the lecturer, we have an Artilleryman who has devoted a great deal of energy, time and thought to the complicated questions of anti-aircraft artillery. Early in 1915, when I happened to be at Shoeburyness as the Chief of the School of Gunnery, Colonel Hill joined there, and he at once devoted himself to improving the drill, training and equipment of the Anti-Aircraft Artillery. I look upon him as one of the pioneers of this branch of the artillery, and it is due to him in a great measure (and to many others, of course) that the Anti-Aircraft Artillery made such great improvements during the War.

There is one other point I would like to mention. Gunnery during the War made great strides forward. This was only to be expected, but during peace, and especially during a long period of peace, there is a danger that some of the more complicated methods evolved during the War may be relegated to the background and eventually condemned to the scrap-heap. I think it is up to all of us as Artillerymen to see that no method that we evolved during the War should be relegated to the background, unless we have a better method to take its place. There is no doubt there is great scope for im-

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provement in all branches of the Artillery, but I do not think there is greater scope in any branch than there is in the Anti-Aircraft.

I do not think I need detain you with any further remarks. You are all anxious to hear Colonel Hill, and I will now ask him to commence his lecture.

COLONEL HILL: General Straubenzee and Gentlemen. During the past war, it is probable that no branch of the service was subjected to keener criticism than the Anti-Aircraft Artillery. It is also probable that if the majority of the critics had had more knowledge of the appalling problems that the A.A. gunner had to face—particularly during the early part of the war—many of their most brilliant and scathing remarks would have been lost to the world.

To enable a just criticism of Anti-Aircraft Artillery to be made it is necessary to have a general knowledge of their organisation, their equipment, the special duties which they are expected to carry out, also a smattering of the elements of A.A. gunnery.

It is not suggested for a moment that to know all is to forgive all, but the more that A.A. problems are studied the more does it give one most furiously to think.

I propose therefore, in the first place to sketch out briefly the general organisation of the A.A. Artillery as it was in France in 1918. Organisation might be considered perhaps to be rather a dull subject, but it is advisable to refer to it, as the capability of A.A. Artillery to perform its various rôles—which are many and various— is intimately bound up with organisation. Then armament and equipment will be considered, as these necessarily impose certain very definite limitations.

ORGANISATION.

Each Army had an Anti-Aircraft Defence Commander who was directly responsible to the M.G.R.A. for the A.A. defence of the Army area. Each Army had a certain number of batteries allotted to it by G.H.Q.; the number of batteries allotted depended on the extent of the Army front, the relative activity on that front, and, of course, it was further governed by the Anti-Aircraft resources immediately available in France.

Army fronts varied considerably, sometimes a front might be 20,000 yards and at another time 40,000 yards; the number of A.A. batteries in an Army being usually 4, 5 or 6.

Each battery consisted of an uncertain number of sections, theoretically four, usually five, but on occasions the number rose as high as seven.

This variation in the number of sections was due to the fact that A.A. reinforcements to France arrived in driblets of one or two sections at a time. These sections were then posted to batteries and there given a proportion of trained spotters and experienced officers. Later on, when G.H.Q. decided to reinforce a particular Army, one or two sections were withdrawn from each of the other Armies and formed into a new battery. The new batteries thus formed had there-

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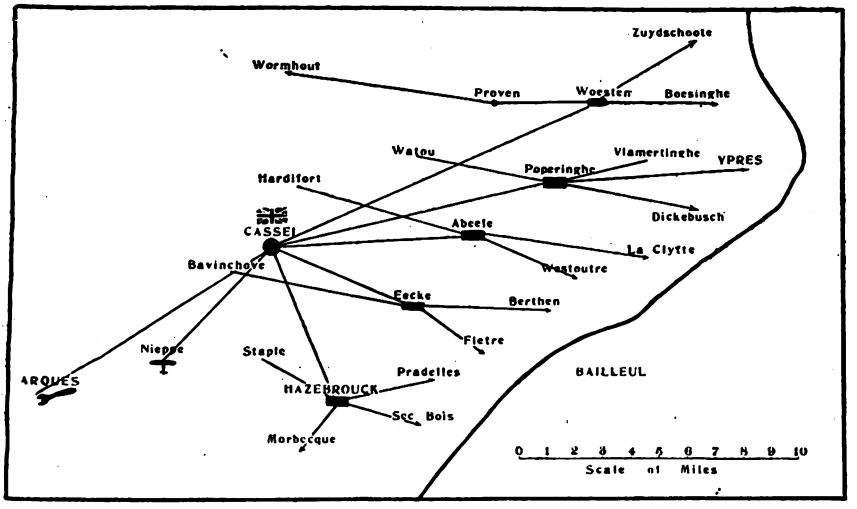
fore a blend of new and old A.A. gunners and were well able to take their place in the line without further training.

Armament.

Nearly all the A.A. sections with the Armies were mobile sections consisting of two 13-pr. 9 cwt. guns mounted on lorries; these guns had a M.V. of 1990 f.s. There were, however, a few semi-mobile sections of 3″ 20 cwt. guns firing 12½ lb. shell with an M.V. of 2500 f.s.

Dispositions.

In stationary warfare, the position of every section of all the batteries within fairly close limits was arranged by the A.A.D.C. and then submitted to the M.G.R.A. who accepted or modified the dispositions. The positions finally decided on became the Army A.A. Defence Scheme.



Second Army A.A. Defence Scheme during June, 1918.

Army Headquarters at Cassel.
A.A. Group Headquarters also at Cassel.
Battery Headquarters shown thus ▬
There were A.A. sections at Battery Headquarters and at each of the localities shown in diagram.
R.A.F. Fighting Wing at Nieppe.
A.A. workshops at Arques.

At first sight, it might appear fundamentally unsound for an A.A.D.C. to give detailed instructions as to the disposal of some two dozen sections instead of allowing his battery commanders to make the dispositions in their respective zones. But in preparing an Army Defence Scheme, there are a number of conflicting requirements which have to be taken into consideration. The first requirement is that all parts of the front line must be covered by the fire of at least

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two sections; further back, the areas may be covered by one section only; then there are a number of localities such as rail heads, dumps or congested areas which require special protection. As at all times, the number of sections available was—and always will be—far too few to give efficient protection to the large areas involved, it was absolutely necessary for the Army to decide which localities should be defended, and then—by avoiding unnecessary over-lapping—to arrange the remaining available sections to the best possible advantage. (When, however, the war of movement started, each battery commander was given a definite zone for which he was responsible. The organisation of the A.A. defences was very elastic and for the most part proved fairly efficient during the war of movement.)

A.A. batteries were allotted to Corps for administration, but tactical dispositions were actually made by Army. Any special A.A. defences required by Corps were, however, arranged for as far as possible, as all Corps in the Army were usually consulted before the Army scheme was finally approved.

The next point of interest is the fact that A.A. batteries were distributed in depth. This method of distribution had the great merit that all reliefs were arranged for in the battery and by the battery, without any reference to group headquarters other than the report of the move; it had also the further convenience in that all billets were battery billets and the battery headquarters were seldom moved.

It was generally found that a month in the front line for a forward section was frequently quite long enough.

Telephonic Communications

All the lines in the Sketch map were special A.A. lines, that is to say that they only passed through A.A. exchanges. It will be noticed that sections were connected up to their battery headquarters, and the latter to group headquarters. Group headquarters had direct lines to Army and to the fighting wing of the R.A.F.

Forward sections on lively fronts frequently changed positions half-a-dozen times during the day, but in most cases, these movements did not exceed half a mile. These forward sections used generally to have a line laid to some convenient dug-out, so that urgent reports could be sent off without much delay.

A.A. Workshops.

Each Army had its own A.A. workshops which kept all lorries and motor vehicles in a high state of mechanical efficiency. The number of lorries, etc., in an A.A. Group amounted to 150 or 200, and there were also some 80 motor cycles.

Two or three lorries complete with guns and mountings were usually kept at the A.A. workshops, so that during periods of overhaul, the A.A. sections could be kept up to strength.

The fact that A.A. workshops were directly under the A.A.D.C. was a very great convenience as any particular lorry could be given priority without any correspondence with other departments.

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Having now, as one may say, placed the pieces on the board, it is more easy to explain the special duties allotted to the A.A. Artillery and to show to what extent these duties can be carried out.

The special duties of the A.A. Artillery.

The special duties of the A.A. Artillery are :—

(1) To keep all enemy reconnaissance and artillery machines as far back or as high as possible, and so force them to do their work under unfavourable conditions.
(2) To interfere as much as possible with bombing machines and those machines employed on photographic and long distance reconnaissance.
(3) To assist the R.A.F. by breaking up formations and by indicating hostile planes by shell bursts; also to attempt the defence of kite balloons.
(4) To defend rail-heads, dumps and other special localities.
(5) To destroy hostile aircraft.

It will be noticed perhaps with surprise that the destruction of hostile aircraft which, in many people's minds, is the one aim and object of A.A. fire is placed last on the list.

Now the reason for this can best be explained by telling you of the instructions given me in December, 1916, by the late General Budworth who was then the M.G.R.A. of the Fourth Army.

On taking up the appointment of A.A.D.C. to the Fourth Army, I wanted to know definitely what policy was to be pursued in the attack of hostile planes; the two alternatives being :—

(1) To continue the existing policy which was to fire at planes at extreme range where the chances of hitting were remote; or
(2) To reserve fire until the planes were on favourable courses at close range and then to attempt to make a bag of them.

The M.G.R.A. IV Army explained matters in the following way. He said that if ten hostile planes appeared and all were engaged and kept back mostly to the extreme range of the guns, he would consider that the A.A. gunners had done all that could be expected of them. But if ten aeroplanes came over and nine of them were allowed to carry on their work unmolested, then, although by carefully reserving fire until a favourable moment the tenth plane had been destroyed, he would consider that the A.A. gunners had failed to carry out their proper task.

And I think that the more one reflects on that statement, the more one is forced to agree with it.

The fact that the instruments then at the disposal of A.A. sections were not of a nature to afford any real certainty that the tenth plane would be hit was another cogent reason for not reserving fire until aeroplanes were at close range.

There is, however, a slight variation to the above policy which at some future date might be considered worth adopting and that is to

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have a few very forward A.A. guns for sniping purposes. These guns, if well concealed and provided with accurate instruments should prove extremely valuable; but in France this scheme could not be put into effect to any great extent owing to the devastated area being almost devoid of cover, the lack of accurate instruments, and the chronic shortage of guns having regard to the large areas that had to be defended.

After this somewhat long digression, the general lines on which the A.A. gunner carries out his various duties will be briefly considered.

1. *Attack of hostile artillery ranging machines.*

These machines usually fly on oval courses of a spiral nature with occasional dashes across the line to verify the general effect of the shoot. Short bursts of gun fire should be employed at predicted points on his course whenever the plane comes within range.

2 *Attack of bombing machines and photographic reconnaissance machines.*

These machines to do their work properly have to fly on straight courses and therefore offer the best targets. Rather long bursts of fire are indicated.

3. *Attack of formations and co-operation with the R.A.F.*

Very long bursts of fire should be used when breaking up formations. If our own planes are in the immediate vicinity, the greatest judgment is required in controlling the fire. The reason being that as the time of flight may be 24 seconds, or over, fire must be stopped sufficiently early to ensure that no inconvenience is caused to our attacking planes.

The general position of hostile planes which are out of range of A.A. guns can be pointed out to our fighting machines—if they happen not to have spotted them—by firing one round at extreme range at about the correct height, and a second round at a shorter range also at the correct height; the two bursts being so arranged that they point in the general direction of the enemy plane.

A.A. guns have frequently assisted our Artillery machines, the R.E.8's, when attacked by German planes. If the latter were out of range, a warning shell was placed between the R.E.8 and the hostile machine. Some A.A. sections had quite a pretty co-operative scheme with R.E. 8's that were being chased by Hun planes; the R.E. 8 used to make for the nearest A.A. section, then, when about 2000 or 3000 yards away, turn at right angles, thus giving the A.A. section an open shot at the Hun. The A.A. guns were then layed on the R.E. 8 with no lateral deflection and a heavy shrapnel fire let loose. I know one A.A. section near Boesinghe just north of Ypres which removed a Hun plane from the tail of an R.E. 8 twice in one morning in the above manner.

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The defence of kite balloons is one of the most trying and nerve racking jobs that the A.A. gunner has to contend with, particularly when there are a number of fleecy clouds at about 5000 feet. The attacking plane keeps above the clouds until within a mile of the balloon, then diving through the clouds suddenly appears, travelling at over 120 miles an hour, about 1500 yards from the balloon.

For balloon defence under these circumstances, the guns are kept loaded and laid to the correct distance to the flank of the balloon on the most probable line of attack. One gunner is kept on the lorry and as soon as a hostile machine appears, he pulls the trigger. Then follows about 25 seconds of pandemonium, the concluding scene being only too frequently the kite balloon descending in flames, the observers descending in parachutes and the Bosche plane disappearing into a cloud with a veritable halo of Archie bursts around him.

4. *The defence of rail-heads, dumps and other special localities.*

This is a highly complicated subject and it would be out of place to attempt to deal with it in a short lecture like the present.

5. *The destruction of hostile aircraft.*

This brings us hard up against the main A.A. gunnery problem, but before attempting to describe the salient characteristics of that particular form of gunnery, I should like to refer to another very special duty, a duty of the highest importance and one that no other branch of the service can perform so efficiently. This duty is the provision of a special form of intelligence with regard to the enemy's flying dispositions.

The various forms of special intelligence that can be obtained by the A.A. Artillery may affect the dispositions of troops even up to those of the highest formations; it has also frequently been of value to the R.A.F. But for that information to be of value, it must be transmitted to the necessary executive authority with the utmost rapidity.

In all A.A. sections, there were a number of very highly trained spotters who could, if the conditions of visibility were good, readily identify the types of all hostile planes at ranges of 10,000 yards and over. From the number, type and general manœuvre of the enemy planes it was often possible to deduce extremely valuable information as to the immediate plans of the opposing commander.

For example, an A.A. section near Armentieres noticed that in the space of about an hour or so, a very considerable number of reconnaissance planes crossed the line over a particular locality. This activity was quite abnormal and was at once reported to battery headquarters. The O.C. battery informed Corps who agreed that it was highly probable that the reconnaissance fore-shadowed a fair-sized raid.

Arrangements were made to give the raiders a hot reception. Additional artillery was brought up, certain changes made in the S.O.S. lines and all guns laid in readiness. The raid took place that night. Almost before the S.O.S. rockets of the infantry reached their

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zenith, the artillery had started gun fire. No man's land was swept; the German trenches and likely assembly spots were heavily shelled, and 6″ and 60-pr. guns dealt with back areas. As might well be expected, that German raid was pretty well launched into eternity.

The type of information of value to the R.A.F. is early news of the appearance of large formations. Reports were on the following lines:—"15 Albatross Scouts, height 12,000 feet, now over Messines flying South-West, time 11.40"; these messages were usually sent direct to Group Headquarters and thence transmitted to the fighting wing of the R.A.F. These were *Clear the line* messages and seldom took as long as three minutes to get from the A.A. section to the fighting wing. Considerable judgment is required when to send and most particularly, when not to send these messages. Time is the essence of the contract, if there is but small chance of the message being received by the fighting wing within a quarter of an hour of its despatch, the message would probably be too late to be of any value. Small formations would not be reported if it was apparent that the R.A.F. machines on the spot could easily cope with the situation.

Every evening a detailed chart showing the distribution, number, type, height and time of appearance of all hostile planes seen during the day was forwarded to the fighting wing.

Also every evening a condensed report of the day's flying was wired to G.H.Q. These reports, together with those of all other Armies, including the French and Belgian Armies were tabulated on a special form which was put before Foch at 8 a.m. next morning. From this form, very valuable information as to forthcoming events could be deduced. For example, if a large number of reconnaissance and artillery planes were recorded on any particular Army front, the odds were that a large scale attack was in process of development. If a large number of fighters were opposite another Army front, it might be deduced that there was some movement in progress which the enemy wished to mask; it might be a withdrawal, or it might be the arrival of reinforcements on a large scale.

As time presses, I will not go into further details, but I hope that I have made it clear that A.A. reports on the enemy's aerial activity are extremely valuable provided that they are transmitted with the utmost rapidity to the necessary *executive* authority. So valuable are these reports, that it might be considered advisable during a war of movement when A.A. lines are non-existent for any A.A. section commander to be authorised to send by *any* telephone line or wireless set a "clear the line" message direct to divisional, corps or other headquarters. Wireless transmission sets with A.A. sections would, of course, be most useful for this type of report.

A.A. Gunnery.

A.A. gunnery is widely different from all other forms of gunnery. In the first place, "fuze range" absolutely supplants the "range in yards." Fuze range is the distance that the shell for a given fuze setting bursts from the gun.

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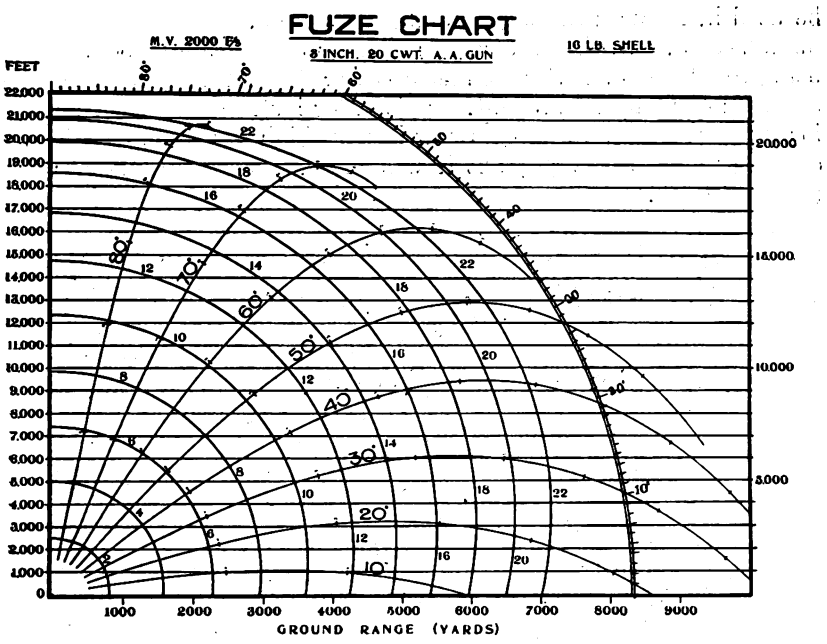

A fuze range is not a constant length, and a given fuze setting does not burn for a constant time; for example, fuze 20 at a low angle of sight will burn for about 19 seconds, but when fired at an angle of sight of 70° it will burn for about 27 seconds.

Gun sights are graduated in fuze ranges; the result of this is that at whatever angle of sight the target may be, the necessary tangent elevation to cause the burst to be on the line of sight is given automatically by elevating the gun until the pointer of the fuze range dial is opposite the fuze ordered.

All A.A. fuzes are set beforehand in whole numbers; the various settings being grouped together in boxes with the setting of the fuze chalked on the box. No fuzes are set during action as the delay would be too great.

Now the question is "What fuze range shall we use," and the answer is that fuze range is determined by the height of the target and the angle of sight. As angles of sight can be readily measured, it will be seen that *height is the dominating factor in all A.A. problems.* If the height has been obtained fairly accurately, there is some hope of hitting the target, but if a serious error has been made in obtaining the height, there is no chance of hitting the target.

Fortunately for A.A. gunners, there has been developed an extremely good height finder, usually referred to as the U.B.2.

This is a magnificent instrument and is capable of giving the height of an aeroplane to within about 3 per cent. Unfortunately, this instrument made its appearance too late in 1918 to enable it to

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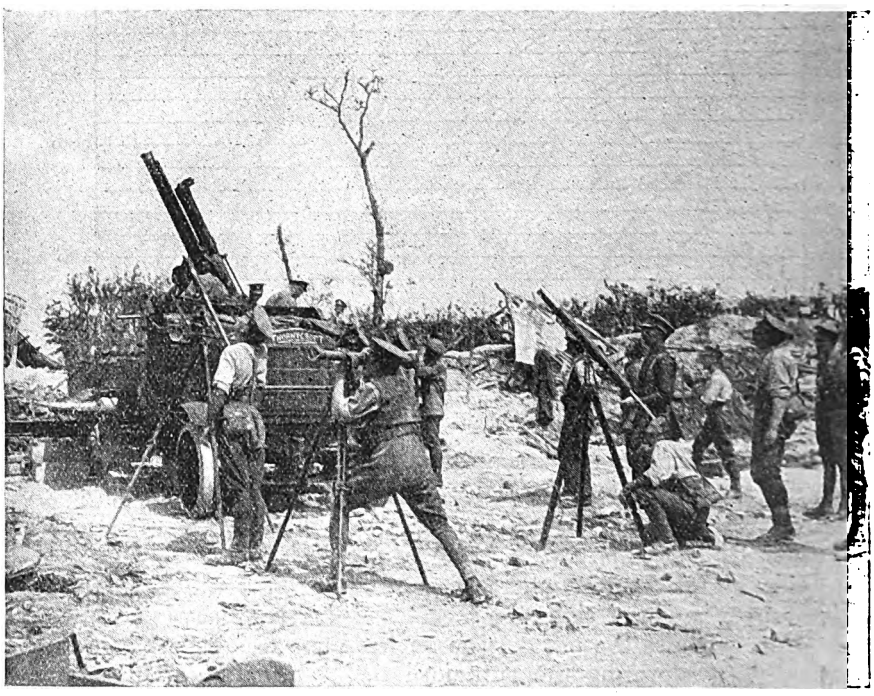
be used in France; the large number now available being of post-war manufacture. During the war, heights were generally obtained by using the Artillery pattern 1 metre Barr & Stroud and converting the ranges thus found into height. This latter instrument was ill adapted for taking ranges to targets moving at high speed at continually changing angles of sight, but it was the only one man range finder then available.



A.A. Gun at Fricourt, 1916.

Heights taken during the war were, therefore, frequently very inaccurate; this naturally gave rise to poor shooting for which the instrument rather than the detachment should have been blamed.

The above photo clearly shows that it was not from want of trying that inaccurate results were obtained.

Now, knowing the height of the target, the fuze range is determined by an instrument which is called the Height Fuze Indicator. This instrument in conjunction with the height finder really gives the A.A. gunner a map of the sky, in which the fuze range is registered to every point. Without these two instruments, or their equivalents, A.A. shooting can only degenerate into a hopeless guessing competition.

The next requirements are the vertical and lateral deflections to enable the necessary allowance for the travel of target to be made.

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In shooting at aeroplanes, a time of flight of 24 seconds is quite an ordinary occurrence. In that time, a target travelling at the moderate rate of 100 miles an hour will cover 1200 yards. For fast moving targets, the travel allowance may be a mile. This distance has to be converted into degrees of vertical and lateral deflection in the plane of sight to enable the gun to be laid at the future position.

Vertical and Lateral Deflections.

Approximate formulæ for lateral and vertical deflections are as under :—

$$\text{Vertical Deflection} = \tan^{-1} \frac{t.v.\sin^2\delta \cos\beta}{H}$$

$$\text{Lateral Deflection} = \tan^{-1} \frac{t.v.\sin\delta \sin\beta}{H}$$

Where t = the time of flight which depends on the fuze which for the moment we do not know.

v = the speed of the aeroplane which is very hard to guess.

δ = the future angle of sight which we only know somewhat approximately.

β = the angle of course of the aeroplane which is exceedingly difficult to estimate.

H = the height which with ordinary luck is known fairly accurately.

The above formulæ are based on the usual assumptions that the height of the aeroplane remains constant and that a straight line course will be maintained.

The vertical deflections may be anything from 0 to 8 degrees and the lateral from 0 to 12 degrees.

It will be seen that with a little care and skill the whole science of A.A. gunnery can be wrapped up in a thick veil of obscurity but the above formulæ can actually be reduced to extremely simple and really very accurate rules of thumb. I do not propose to go into these rules now as time presses and I wish to sketch out the broad outlines of the various problems rather than to explain in detail any particular A.A. problem.

Various instruments have been devised from time to time to determine the fuze range simultaneously with the vertical and lateral deflections, of these the Brocq instrument has been the most successful up to the present. But the Brocq instrument is unsatisfactory in many ways. It is electrical and it has various leads, rheostats, voltmeters and other vulnerable or delicate parts which in mobile warfare, when travelled in lorries and subjected to hard usage frequently break down. It also has the disadvantage that it introduces curious errors owing to the manner in which it produces its data. These errors have

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been neutralised by special scales on the gun sights, but this is not a happy solution as the sights become very complicated and give the layers too much to do.

It is hoped, however, that in the near future other instruments of a more robust nature, mechanical as opposed to electrical, will supersede the Brocq and permit of the use of a simple sighting gear.

Calibration.

In A.A. gunnery no interest whatever is taken in muzzle velocity as muzzle velocity, but its effect which is loss of height for a given trajectory is taken up as a ballistic height correction. Calibration is therefore carried out to determine the ballistic height correction that must be applied. For example, if the guns of a section owing to wear or other causes fail to realise the range table height by 10%, a false height 10% greater than the height of the target is applied to the height fuze indicator. The result of this is that a longer fuze range is indicated which compensates for the loss of muzzle velocity; the longer range also implies a greater elevation.

Wind.

One of the bugbears of A.A. gunnery is the necessary correction for wind.

Meteor telegrams which give the force and direction of the equivalent constant wind at various heights are sent off every four hours. From the figures in these telegrams, the necessary lateral and vertical corrections can be worked out as soon as the course of the plane with regard to the wind has been established. As planes may be flying in any direction with regard to the wind, the deflection on any day may be "Up" or "Down" in combination with "Right" or "Left." Even in a single shoot, the wind correction may begin by being "Right," then gradually develop into an "Up" correction and subsequently become "Left."

The structure of the wind on one particular day is shown in Figure I. Each vane represents the direction and velocity of the wind over a height of half a kilometre. The wind at ground level was about 8 miles an hour and steadily increased at higher altitudes until at about 18,000 feet, it had a velocity of some 60 miles an hour.[1]

In Figure 2 another wind structure is given. In this instance, a wind of considerable velocity on the ground diminished to a calm at 6000 feet, and above that height blew in the contrary direction.

These diagrams give some idea of the wind problems that have to be solved by the A.A. Artillery.

[1] On October 19th, 1917, a fleet of Zeppelins which had been carrying out a bombing raid on London rose to high altitudes for their return journey. Here they encountered a wind of similar structure, but blowing from the North, which wafted them over France where they were destroyed. The fact that they were off their course was not realised as their directional apparatus had been skilfully jammed.

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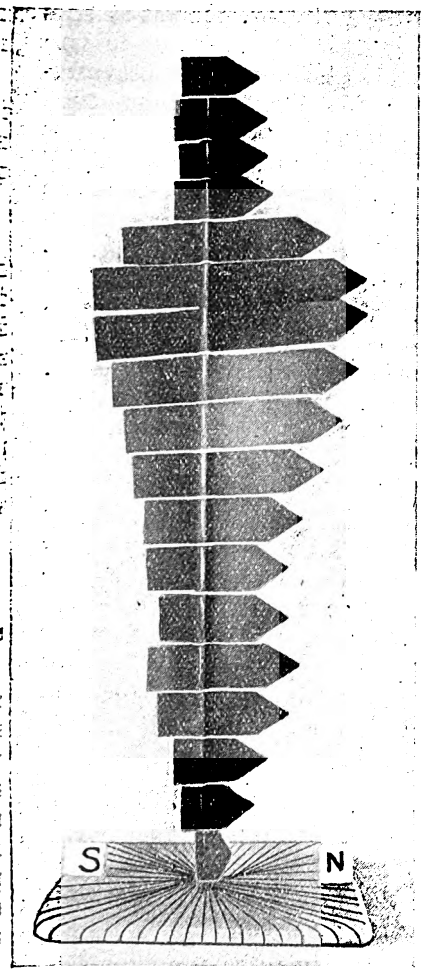

Fig. 1.

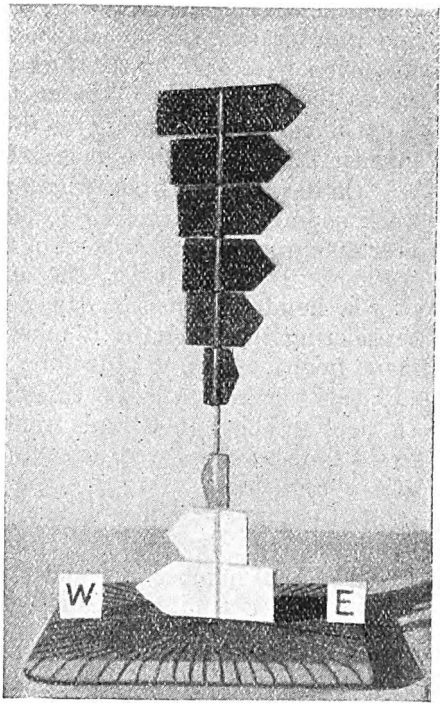

Fig. 2.

A very hasty survey has now been made of the principal elements of A.A. gunnery,[1] but I think that it is clear that the A.A. officer has to contend with a large number of appallingly difficult problems, all of which have to be solved at speed.

These difficulties, during the early years of the war, were enhanced by the fact that but few suitable instruments were at his disposal.

Enemy Aerial Activity.

Some idea of the enemy's aerial activity may be gained from the following figures. Four A.A. batteries of the Fourth Army in the 6 weeks ending the 11th of March, 1917, fired over 29,000 rounds,

[1] For fuller details, I would recommend those interested in the subject to read the excellent article on A.A. Gunnery by Captain Loch in the "R.A. Journal" of September, 1919.

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of which over 15,000 rounds were fired in a fortnight. It was at this period, that the Germans were executing their retirement on to the Hindenburg line and large numbers of fighting planes were endeavouring to cover the movement. The above expenditure of ammunition was somewhat on the high side, but I think that most other Armies at one time or another probably exceeded it. I do not think that it was even a record for the Fourth Army, but I happened to come across the figures when looking up some notes.

On one occasion during the third Battle of Ypres, one section commander fired over 800 rounds before breakfast.

On the Nieuport front, which was only 6000 yards in extent, in the week ending 22nd July, 1917, 368 hostile planes were engaged and over 4000 rounds fired. Most of this shooting was done by four A.A. sections. During August, the activity was greater, on many days over a hundred planes a day were engaged by A.A. sections. In considering these figures it must be borne in mind that the same plane might come into range of various sections on several occasions.

One subaltern who was commanding a single gun on the outskirts of Nieuport about 1500 yards from the front line had an exceptionally lively time as there were over 20 hostile planes within range of his gun at one time. But this was unusual good fortune. On quiet fronts there were often periods of many days on end without a round being fired.

The total number of rounds fired by A.A. Guns in France during 1918 was over a million rounds of 13 pr. and about eighty thousand rounds of 3″.

Results Obtained.

Now after so much shooting, one naturally wants to know what number of planes were brought down. I have no figures of the average results prior to 1917, but for that year, I found that one plane was brought down for every 8000 rounds fired.

This may seem a poor result, but the main reasons for the bag not being larger were :—

(1) In accordance with the policy laid down, all aeroplanes were engaged at the earliest moment, i.e., at extreme range.
(2) The lack of proper instruments; good height finders were not available, and only a few sections had height fuze indicators—and those of local manufacture.
(3) There is all the difference in the world between hitting a plane and in bringing it down.

The fact that aeroplanes can be repeatedly hit without necessarily causing much inconvenience to the pilot is clearly shown in "Winged Warfare" a wonderful book by Major Bishop, VC, D.S.O., M.C., who, as you know, succeeded in bringing down forty-seven Hun aeroplanes. On page 193, when referring to the shooting of the German A.A. guns whilst he was attacking German Observation Planes, he states :—"As is was, we were nearly always hit by small fragments, but this

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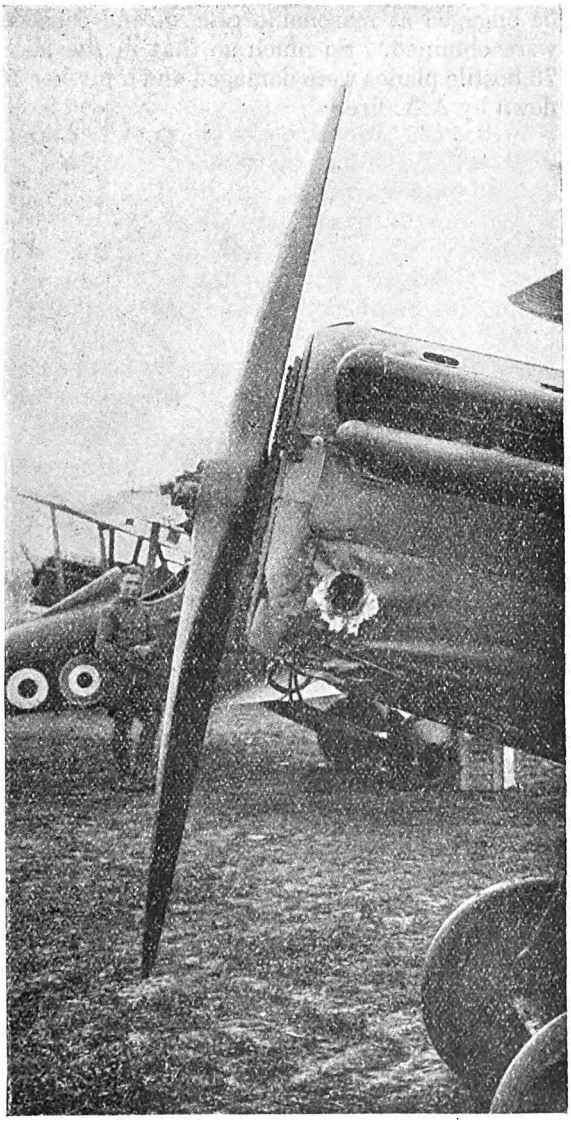
was considered nothing, and, of course, no reason for not liking the job." And again, after returning from a successful attack on an enemy aerodrome :—"As I crawled out of my machine, I heard the remarks of the mechanics around me. They were looking it over. Everywhere it was shot about, bullet holes being in almost every part of it, although none, luckily within two feet of where I sat. Parts of the machine were so badly damaged as to take a lot of repairing, but I used the patched planes in the machine for some time after."

There is little doubt that quite considerable numbers of hostile planes were hit but got back safely to their aerodromes.

By January, 1918, all sections were equipped with height fuze indicators and a marked improvement in the shooting immediately resulted. During the last ten months of the war, one bosche plane was damaged or brought down for every 4550 rounds; and I was told that at certain periods the figure worked out at one plane for every 1500 rounds, but I cannot give chapter and verse for this last figure.



British aeroplane which after being hit by German A.A. gun got back safely.

A further cause for this great improvement was that during the war of movement, all troops were in new positions with plenty of cover—a very different state of affairs as compared with the devastated

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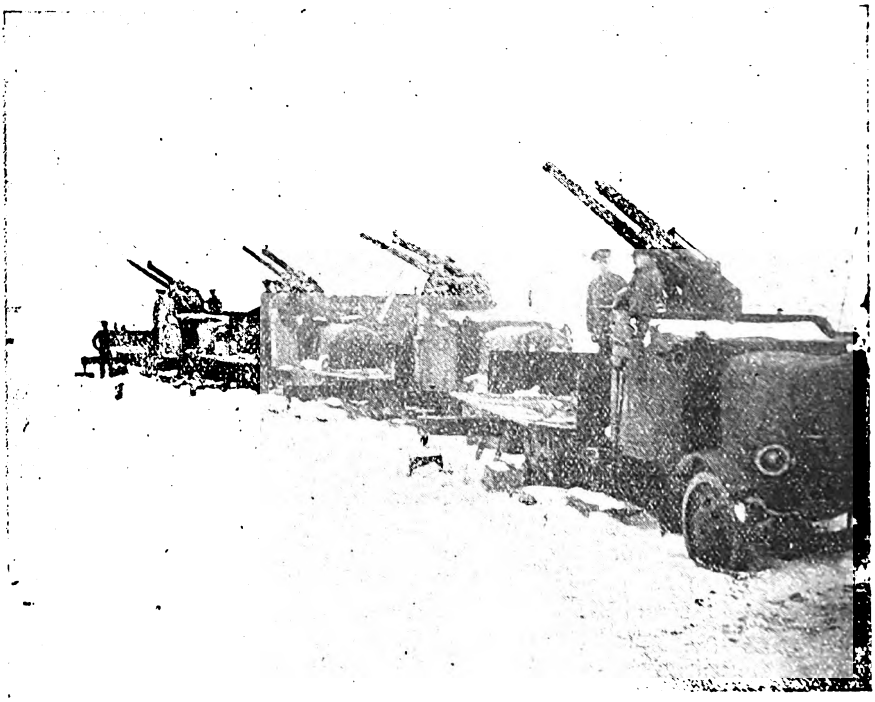
area. Largely owing to this fact, hostile reconnaissance planes had to come in much closer in order to locate the new artillery positions. A.A. guns also, owing to the cover now available, were able to work much further forward. This double effect caused many aeroplanes to be engaged at reasonable ranges, and consequently far better results were obtained. So much so that in the last ten months of the war 73 hostile planes were damaged and a further 168 were actually brought down by A.A. fire.[1]



4 Gun Positions.

In the diagram showing the Army A.A. Defence Scheme, all the positions there shown were occupied by sections of 2 guns. It is, of course, vastly preferable to employ A.A. guns in groups of 4, but owing to the shortage of guns this could seldom be done as it meant denuding other areas. Four guns, even if available, can seldom be used in the front line as the target offered is enormous, as is shown in the above photo.[2] Such a conspicuous target would soon be attacked, and, in a cramped position, a hit on one gun might lead to the destruction of all four guns. Generally speaking, it is advisable in forward

[1] These figures were vouched for by Major Newton as the correct G.H.Q. figures in the possession of the A.A. School.

[2] The photo as it is taken in snow gives an exaggerated idea of the danger. In broken country with hedges and small out-houses, four guns can often be skilfully tucked away and so present a difficult target to range on.

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positions subject to heavy bombardment to use A.A. guns in pairs. But on lively fronts, it is often necessary to employ single guns.

In a general engagement, the use of four A.A. guns in fairly forward positions is more possible as most of the opposing artillery will have been allotted definite tasks and so cannot be turned on to the A.A. batteries.

Mobility.

The weight of the gun and lorry is, when loaded, some 8 or 9 tons. This great weight naturally reduces the number of possible positions that can be occupied. In wet weather, many by-lanes become impassable and positions are then restricted to hard ground in the immediate vicinity of good roads. In dry weather, there is very much greater choice of positions, as the gun lorries can easily travel over sound turf; but plough land and small ditches can seldom be traversed.

Temporary bridges have to be very strong to allow of the passage of A.A. gun lorries. At Peronne I once saw an A.A. lorry successfully negotiate a pontoon bridge, but it was a very near thing as the pontoons were submerged to within a couple of inches of the gunwales.

Owing to the limited number of positions available near Nieuport, an A.A. gun was mounted on a Decauville (narrow gauge) truck. This proved a great failure. The Decauville track had evidently been photographed by reconnaissance machines, as very accurate shooting from 4·2″ guns soon rendered the various positions taken up quite untenable.

An A.A. gun was taken off its lorry and put into position close to a concrete pill-box near Langemarck; this gun did very good work. But a shift of this nature takes a lot of preparation including the putting down of a wooden platform of heavy baulks bolted together.

A.A. gunners would naturally welcome some sort of track vehicle that could go across country, but the working out of this scheme entails the solution of a number of exceedingly awkward mechanical problems. The weight of the present equipment imposes severe limitations on the A.A. gunner.

The Ideal A.A. Gun.

The type of gun that the A.A. gunners would like to have is a light mobile gun firing a heavy shell with a high muzzle velocity, but these conditions are incompatible. The actual weight of the 3″ 20 cwt. gun and mounting, excluding the lorry, is 5 tons. If the weight of shell, or the muzzle velocity, is increased, the weight of the gun and mounting must also be considerably increased with the result that mobility will be very much reduced.

A high muzzle velocity means that the gun will have a short life, particularly so with the high rate of fire required for A.A. guns. In France, the 3″ 20 cwt. guns having an M.V. of 2,500 f.s. had a life

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of about 1,500 rounds. On an active front, a gun might easily fire 1,500 rounds in a week.

For rapid and accurate shooting, a steady mounting is required. Now the trunnions of the cradle of the 3″ 20 cwt. gun (when mounted on a lorry), are 8 feet above the ground. Compare this with the height of the trunnions of the cradle of the 18-pr. which is 3 feet above the ground.

One of the problems of mounting A.A. guns on tanks is to get the trunnions as low as possible and also to reduce weight, but track vehicles are far heavier than motor lorries.

Guns firing a shell of less weight than 12 lbs. are of little value owing to their short range, their lack of shell power and the fact that no very great saving is made in personnel; the staff required for manning instruments is very much the same as that required for a gun of reasonable power.

Various Notes.

In the summer months, the A.A. subaltern has to be on duty for very long hours; it is not unusual for A.A. guns to be in action from 4 a.m. till 10 p.m. Owing to these long hours, it was found necessary to have three subalterns in each section, thus dividing up the work and at the same time creating a reserve of trained officers to replace casualties.

A.A. Gun in Combles.

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After a long shoot at reconnaissance planes, a change of position is generally advisable even if the change only amounts to a few hundred yards.

A section in Combles during February 1917 frequently had to work as single guns and even then change position 8 or ten times in a morning; sometimes the guns were driven out by shell fire and sometimes they were urged to change position by some unit which disliked their propinquity. On one occasion, an A.A. gun had taken up its position close to the headquarters of a gunner colonel and every time the gun fired the lamps in the headquarter dug-out were blown out; about the third time this happened the section were given a cordial invitation to move elsewhere.

Distant Observation.

In France, distant observation was seldom attempted owing to the number of planes that were in the air at the same time; it was even found difficult enough when using a Hartree height finder which has two stations about a mile apart, to get both stations on to the same target; although the method of indicating the position of the plane from one station to another is extremely positive. On some occasions clouds absolutely prevented the distant station from seeing the plane; at other times, haze prevented one of the stations from picking it up.

It is also next to impossible, if two sections are firing at the same time, to know which sets of bursts belong to which section. On very quiet fronts, neighbouring sections used to telephone the results of shoots to each other; this sometimes was of value for if the height was too high or too low, a correction could be made if the same target came into range a second time.

Distant observation requires the greatest judgment to enable the results to be of any value, as will be seen from the following example :—Suppose an enemy aeroplane at 12000 feet to be travelling at 100 miles an hour directly towards an A.A. section and that 4 rounds of gun fire with fuze 22 is ordered, it will take at least 8 seconds with a well drilled detachment to get off the rounds. During that period the target will have advanced 400 yards and the rounds of gun fire will be spread out on the arc of a circle whose radius is the fuze range; the difference in height between the top and bottom rounds will be about 600 feet. If the rounds of gun fire take longer than 8 seconds, the dispersion in height will be proportionately greater.

This vertical belt of fire might puzzle a distant observer unless he knew exactly what to expect.

On paper the scheme appears sound enough but when put into practice it will very often be found that some atmospheric effect prevents any result from being obtained. With a blue sky, the bursts may be visible but the plane invisible; with a cloudy sky the bursts may fail to show up against the white clouds; if two planes are in the same neighbourhood, the observer may be sending down his observations with regard to the plane that is not being engaged.

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Having regard to the accuracy of the U.B.2. and the fact that the whole principle of A.A. fire is based on a careful previous preparation rather than on any system of bracketting or spotting corrections, distant observation will in my opinion seldom be worth the added personnel which its employment necessitates. But this is only a personal opinion; it is seldom that absolute unanimity of opinion is obtained in A.A. questions or for that matter on any other question as, for example, reparations, battleships, or fiscal reform.

Barrage Fire

One of the special duties of A.A. sections in France was to protect our observation balloons. And as I have explained previously this was generally attempted by barraging the most probable line of advance. At first sight, it would seem to be quite a reasonable task to ask two A.A. guns capable of firing 30 rounds a minute to keep an aeroplane away from an observation balloon whose height and range were accurately known. But in practice, it was generally found that a determined airman would risk the barrage, sometimes flying through it, at other times zooming over or ducking under the smoke of the bursts, and then proceed to attack the balloon from the far side. Barrage fire undoubtedly saved several balloons, as all airmen would not face the barrage; but airmen that had the nerve to carry out this attack were only too frequently successful. It is probable that machines were often hit, but machines can take a lot of hitting without being brought down.

Sometimes three A.A. sections contributed to the defence of observation balloons, but even then it was impossible to guarantee their safety.

The German A.A. guns were not more successful than ours in balloon defence. There was a celebrated Belgian Airman—whose name I cannot recall—who made a hobby of attacking German observation balloons. I remember seeing a telegram at Belgian Army Headquarters announcing that this officer had just brought down his 23rd German observation balloon.

Barrage fire was occasionally used at Dunkirk. It certainly made the German planes fly higher and no doubt interfered with accurate bombing; but no town, parish, or even small locality can be kept immune from bombing raids by determined airmen, even if very large numbers of A.A. guns are available for barrage work. Occasionally 8 or 10 guns were run down to the outskirts of Dunkirk to assist in repelling the raids which were of nightly occurrence. The German aeroplanes used to fly from Ostend down the sea coast well out of the range of searchlights or A.A. guns, then circle in over Dunkirk sometimes with engines cut off, drop their bombs and make a big sweep out to sea again.

Occasionally a few rounds were fired in the probable direction of the planes as judged by sound, but the chance of hitting an invisible target at an unknown height and at an unknown fuze range is exceedingly remote. Rounds fired at invisible targets were therefore

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principally fired as a practical demonstration of sympathy with the inhabitants. As soon as the hostile aircraft were picked up by the searchlights a heavy fire was maintained so long as the targets were in range.

During a raid, there is so much noise going on, guns firing, bombs crashing, syrens wailing, etc., that sound locators are of little value, particularly if several aeroplanes are in the air at the same time, which, of course, is the usual state of affairs. A decoy aeroplane to induce the searchlights to open out and the machine guns to open fire is often the prelude to a raid.

If firing at sound is indulged in, the only person who can give a reasonable indication of direction is the officer with the guns. He alone is in a position which enables him to select the noisiest centre upon which to direct his barrage fire.

For barrage purposes in field operations, the allowance of guns is usually 4 guns per 100 yards, and here the height of the required barrage is definitely known. In A.A. work, the sections are usually 3000 to 4000 yards apart, height is seldom known and targets travel at high speeds, so A.A. barrages are apt to be distinctly thin although high rates of fire can be maintained for short periods.

The actual value of a barrage at an invisible target at an uncertain height and unknown fuze range is perhaps best shown by the analysis given in the next subject for consideration which is the 1000 yards cube.

The 1000 Yard Cube.

Every one is naturally anxious to bring down planes, and one proposal which might be described as a hardy annual is to have a number of guns all laid on different selected points which at a given signal could all be fired together. It is interesting to work out the number of guns required for this scheme. Let us take the case of an aeroplane known to be flying between the heights of 8000 and 11000 feet above the area bounded by the Ritz Hotel—Hyde Park Corner—Victoria Station and Queen Anne's Gate. The aeroplane is flying in a cube having sides of 1000 yards. The volume of that cube is a thousand million cubic yards, the whole of which has to be filled with flying fragments.

Now the burst of a 16 lb. shell might have a danger space of 10 × 10 × 10, i.e., a thousand cubic yards; if that danger space is considered too small, multiply it by ten and so get the exceedingly optimistic estimate of ten thousand cubic yards.

The required number of guns is therefore $\frac{1,000,000,000}{10,000}$, which is one hundred thousand.

It is evident that it would be difficult to get that number of guns into the space available; and assuming that the detachments consisted of five men per gun, the A.A. defences of Green Park would require half a million men.

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With figures such as these before one it is clear that barrage fire at invisible targets is desperately expensive, and that the picking up of targets at night is, therefore, of paramount importance. Sound locators are in my opinion most unsatisfactory; the operators—unless they are very carefully watched—go on listening with stethoscopes in their ears long after their auditory nerves are completely tired out. What is required is a simple mechanical sound locator, but no one seems clever enough to produce it. This invention might be a small trumpet fitted with microphone and lamp, the trumpet being so constructed so that all sound rays other than those within 3° of the source of the sound are either polarized or reflected; when the trumpet is pointing within the 3° limit, the microphone should cause the lamp to be illuminated. For portability, the whole outfit should be as small as possible. It really seems extraordinary in these days of wireless, loud speaking telephone, valves and supermicrophones that the combination required for A.A. work has not yet been produced.

Square Degrees.

The great difficulty that searchlights have in picking up targets at night is clearly shown by the following considerations.

The beam of the searchlight is about 3 degrees in diameter, the beam is therefore capable of illuminating an area of $\pi\ (\frac{3}{2})^2 = 7$ square degrees (to use a somewhat unusual nomenclature). Now the area of a semi-sphere is over 20000 square degrees, if, however we eliminate all parts of the hemisphere below 25 degrees angle of sight, this number is reduced to 13000.

It will be seen that there can be much searching without much result. Owing to the large figures involved, it would appear advisable to have two types of mechanical sound locator, one having an effective radius of 8° covering 200 square degrees and another having an effective radius of 3° covering about 30 square degrees.

Conclusion.

During the past hour I have endeavoured to sketch out on the broadest possible lines the general work of the Anti-Aircraft Artillery and to explain a few of the many problems which confront the A.A. gunner.

You will have noticed that no attempt has been made to forecast the future policy of the employment of A.A. Artillery in the field.

I have dealt almost exclusively with the methods employed in France during the last two years of the war. My object has been to chronicle a number of past experiences, so that the various failures, and successes can be taken into consideration when new methods are being devised.

The future, of course, holds out prospects of far greater successes than those attained during the latter part of the war, although I would remind you that in the three months—March, April and May of 1918, 87 aeroplanes were brought down by A.A. fire. A.A. gunners in the next war will start off with a first rate height finder; and it is hoped

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that at an early date instruments of a highly practical nature will be forthcoming to solve all their other requirements. The one thing that is likely to be lacking is a sufficient number of trained A.A. officers to command the large number of A.A. sections that will be required. It will be remembered that the Germans towards the end of the war were turning out aeroplanes at the rate of 2000 a month,[1] so there will be no shortage of targets.

Some officers may be deterred from taking up A.A. work as they imagine it to be over full of diabolical calculations. This is not really the case. There are a number of fearful calculations involved, but these, for the most part, have already been done by ballistic and design experts whose duty it is to cast the A.A. horoscope into gun sights and instruments of such a practical nature that they can be readily made use of by the regimental officer.

An A.A. section commander has great responsibilities and has constantly to be taking immediate action without referring to higher authority; he has to be very alert, full of drive and must possess great powers of endurance; it will be seen that a very high standard is required for A.A. work. Fortunately, in the Royal Regiment there are a good many gunner subalterns who can fulfill these conditions.

In conclusion, I can only hope that many of them will—by dint of hard work and knowledge of the game—rival Ashby's historic performance at Villers Bretonneux when he succeeded in bagging a right and left.

THE CHAIRMAN: Gentlemen, I have missed my train, so I suppose we are all out for a really happy evening. I call upon any Officer who would like to ask the lecturer any questions.

(No questions were asked.)

Well, Gentlemen, we have listened to a most interesting lecture by Colonel Hill. There is no doubt he has taken a tremendous amount of trouble to prepare it, and it has been not only interesting but instructive. It only remains for me to ask you all to join with me in expressing a hearty vote of thanks to Colonel Hill for his most excellent lecture. (Applause.)

[1] Neumann's "The German Air Force in the Great War," page 51.

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A EUROPE OF SMALL NATIONS.

By MAJOR-GENERAL SIR W. E. IRONSIDE, K.C.B., C.M.G., D.S.O.

THERE is no more fascinating study for the soldier than a comparison of the map of Europe in 1914 with that of the present day. The permanency or otherwise of the new arrangement of states means much to the soldier, for, owing to some obscure cause quite beyond his ordinary horizon, he may again be called into action as he was in the Great War.

The Austro-Hungarian Empire has disappeared, leaving behind a crop of smaller nations in its place. The Balkans now extend far into the heart of Europe. Russia has lost her coast line in the Baltic through the creation of Esthonia, Latvia and Lithuania and the complete independence of Finland. Poland has been reconstituted as a nation of large size. Yugo-Slavia and Roumania have both doubled their original territory. Italy and France have won back portions of territory lost to them for long periods of years.

What is to be the outcome of this new arrangement of nations in Europe? Will there be a still greater extension of the Balkans by the secession of Saxony and Bavaria from the German Reich? Will any of the newly created states continue to extend their territories and so repeat the cycle of history, or has the day of great nations gone for ever? Will the League of Nations really be able to protect the weak against the strong, and so defy the laws of nature? These are some of the questions which every thinking soldier asks himself.

The century of European history which culminated in the Great War of 1914, may be called the period of Great Nations. Great Britain, France, Russia, Austria-Hungary, Italy and Germany, each in its own peculiar way, had succeeded in building for herself a great state, and it is undoubtedly correct to say that it was the jealousies of these great states which caused the war. It was their number and their wealth in population and money which made the war so tremendous, and thus the whole world suffered instead of only portions of it as in previous wars. Do the great states, therefore, stand condemned? That there will be no more great states seems unlikely, for the desire to create a great state lies dormant in every nationality. It arises from many causes, but from none so much as from an imperative necessity for national security. In the world there is little mercy for the weak, and those nations which have little covet the possessions of those which are rich, with the result that no sooner has a nation achieved internal order and commenced to store up riches than it begins to look to its external security. Intercourse with larger nations shows the growing state that it is wealth which brings increased

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comfort. Wealth in population, in raw materials, in manufactures and in trade. Wealth can only be amassed in peace time, and to ensure peace one must be strong to prevent aggression from outside. Hence the necessity for national security.

Great Britain and France, being sea-faring nations, were the first to move out into the world. For them the road to Empire lay across the sea. Fighting much with each other and with those nations which had preceded them abroad, the Dutch, the Spaniards and the Portuguese, these two Powers finally settled down in their own spheres with vast territories in Africa and Asia. It was only at the end of this process of expansion that Germany and Italy were ready to enter the list of competitors, and consequently found little left for them to acquire.

By 1880, the world had been parcelled out amongst the European nations, and the United States had asserted the inviolability of the Americas from further conquests from Europe.

For Russia, the ruling desire was for an ice-free port as an outlet for her vast territory. She had acquired Finland and the coast-line from Riga to Memel, and had moved Eastwards into Siberia until checked by the rising power of Japan in 1904. Could Constantinople but fall into her hands she might be irrestible.

So far, each of these great states had mainly sought the waste spaces of the earth for their surplus populations, and territories from which to draw raw material for their factories. They had come into contact with small nations only, many uncivilized, but all weak and easy to overcome. Development was, however, moving quickly. The acquisition of a port upon a sea-board soon demanded a hinterland for the security of that port. These hinterlands, protectorates, spheres of influence, call them what we may, began to touch one another. Great states, which had previously been remote, came into violent contact over the rights of empire in every quarter of the globe. Russia and Great Britain touched on the Hindu Khush, and it was only a matter of time before they would have touched in the centre of Persia. France and Great Britain touched in the Soudan and West Africa. Germany and Great Britain touched in East and West Africa. Quarrels over frontiers became a question of wars between great states and not between a great state and a small state. European wars loomed large, but diplomacy triumphed over these distant squabbles and frontiers were quickly delimitated by mutual arrangement, great territories inhabited by many hundreds of thousands of coloured peoples, being transferred from one European nation to another. The inhabitants of these territories could make no great resistance to their fate, nor had they any patrons to take up their cause, so they could but provoke a small war.

So much for all but one of the great nations of Europe. The road to empire for Austria-Hungary, however, ran along difficult paths. Her Empire was to be confined to Europe. Her operations of expansion were to be under the bright eye of publicity and to take place

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at the expense of other smaller white nationalities. And these small nationalities had many patrons in Europe to espouse their cause. Even the tiniest strip of European territory could not be transferred from one nation to another without an outcry. Absorption could only take place at moments favourable to the aggressor. Alsace, Lorraine, Schleswig and Holstein were all absorbed at favourable moments after a successful war. The moments for absorbing territory for Austria-Hungary had to be most carefully chosen. In mutual protection, perhaps more than for any other reason, Austria and Hungary had united themselves under one Crown, and together these two master nations sought their security in the formation and expansion of the Austro-Hungarian Empire. It was just as intolerable for Austria-Hungary to have disorder on her frontiers as it was for other empires, although these frontiers were close at home and not in Africa or Asia, and so the Austro-Hungarian Empire grew up in a normal way. Ports in the Adriatic required the acquisition of Bosnia and Herzegovina just as with ports and hinterlands in other empires. Thus in 1914, the Austro-Hungarian Empire included many nationalities. Germans, Magyars, Czechs, Slovaks, Ruthenians, Saxons, Croats, Slovenes, Serbs and Roumanians, all directed by the two master nationalities. It cannot be denied that Austria-Hungary achieved a measure of internal order, at a moment when the newly-freed Christian nationalities around her fought with the Turks and amongst themselves. Indeed, the Balkan situation had become so dangerous that Austria-Hungary turned her eyes towards Serbia, evidently with a view to quietening her also by absorption into the Empire. Serbia, having a great patron, Russia, to whom she applied in her hour of need, was not to be absorbed with ease, and the quarrel ensuing was the direct cause of the Great War. Austria-Hungary had mischosen the moment for expansion or miscalculated the factors against success.

The resulting struggle led to the liberation of the subject nations in Austria-Hungary and Russia, and the principle was laid down that these nationalities were to be allowed to self-determine their own future. Disintegration is the usual fate of an unsuccessful combatant in war and this has been the case also in the late war, for Germany has lost her subject-nation, Poland. But it is significant that Germans and Russians have held together the remains of their Empires and, despite every factor militating against them, have retained their purely national territory intact.

The British Empire has been built up through colonisation and conquest. Even colonists of like nationality to Great Britain have shown that they insist upon freedom to develop in their own way, as evidenced by the revolt of the American Colonies, and so the main principle of government in the British Empire has been one of individual freedom within the Empire. The Transvaal and the Orange Free State were acquired by conquest, but within a very few years both were given freedom by the Constitution of the Union of South Africa. Who can maintain that this principle is not the correct one?

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Had the Transvaal and the Orange Free State not been given their freedom before the Great War there is more than a probability that we should have had a great Colonial struggle in Africa to compete with instead of finding a loyal Ally to support us. The Union of South Africa not only put down a rebellion in its own territority but supplied forces to capture both German South-West and German East Africa, in addition to sending a strong contingent to help in Europe. Surely this is a shining example of the results to be obtained by granting complete freedom.

The Germans, Russians, Austrians and Hungarians had no conception of the granting of freedom. It is true that European conditions were much more difficult than those prevailing in South Africa, but the South Africans were a strong and sturdy white race, and if one examines the Constitution of the Empires of Germany, Russia and Austria-Hungary, one can find little indication of any attempt at the conciliation of their subject white nations by the granting of freedom. Germany perhaps made the nearest attempt in Poland, and in her portion of Poland her efficient organisation was a contrast to the conditions prevailing in either Austrian or Russian Poland. Both Austria-Hungary and Russia commenced with a suppression of the subject languages. They were of the opinion that if they suppressed the language they would incorporate the subject nationality completely. Language is a curious thing. It is the outward expression of nationality, and it is regarded as the most precious of all things by any people aspiring to call themselves a nation. Suppression does not seem to kill a language. Even if books are not available, or if the language has not been reduced to writing, it survives by being passed on from mother to child, and will burst out again on all possible occasions. There is nothing of which the new states in Europe are more jealous than of their languages. In the British Empire, the most extensive freedom of language has been allowed, with the result that though the lesser used language exists, still for all general and commercial purposes the English language is assuming a stronger and stronger position. It is only by the natural intercourse and the necessity of everyday life that languages can settle down into their proper positions. It is undoubted that had the Russian and Austro-Hungarian Empires allowed more freedom of language amongst their subject nationalities, the ordinary course of life would have placed the most useful languages in the premier positions. Language is the great means of intercourse between nations and the attempt to solve the curse of the Tower of Babel by the introduction of Esperanto has met with little success owing to this intense national feeling. But there is no need to despair on account of this multiplicity of languages, for the smaller nations have solved the difficulty by becoming bilingual and even tri-lingual. A great nation will not trouble to learn the language of a small nation, so the small must conform to the great. German is no longer the commercial language of the States of the late Austro-Hungarian Empire, nor is Russian employed in the Baltic

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states, though naturally there are many people who understand these languages, as a consequence of the old régime. Costs of printing and literature generally have now gone up in countries having small populations speaking a separate language, for the circulation of a cheap edition in English must be greater and consequently cheaper than a like edition in, say, Czech. The revival of international commerce will, however, soon place languages once more in their proper positions. The small nations, while retaining their own language, must acquire the necessary additional languages for general intercourse, or be left out of the race for progress in civilization. This they appear to realise thoroughly.

Self-determination being the principle of the new arrangement in Europe, we find that the map presents many curious features. It has been pointed out that every nation looks to its external security, and security is indissolubly bound up with frontiers. Frontier delimitation in distant territories has usually followed geographical principles, but this has not been so in the new Europe. Now the main principles governing the delimitation of an ideally secure state appear to be as follows :—

(i) The frontiers should be as short as possible and should rest upon natural obstacles, such as rivers, mountains and deserts.
(ii) Capitals and chief industrial centres should lie towards the centre of the state.
(iii) There should be sufficient ports to supply the necessities of trade, and natural communications should be under national control.
(iv) There should be raw materials available for factories and industries in the state.
(v) That the minorities in states of mixed nationalities should be rendered contented.

It may be assumed that every state that does not feel secure will attempt to make itself so, or it will always have the horror of disintegration before it. The League of Nations is an attempt to secure all states, but all its efforts will be unavailing if the foundations of the present states are unsound. It is an interesting study to apply the principles quoted above to the present map of Europe. Every principle that is violated is a possible cause of irritation, which may lead to war, if the situation becomes intolerable. A further cause for danger is that the Peace of Versailles has not destroyed all great states. Those remaining have a tendency to group the smaller states under their patronage and the stronger a nation, the less likely is it to bend to the will of any such Committee of Arbitration as the League of Nations.

Let us take these principles and apply them to definite cases in Europe. Czecho-Slovakia is very long and narrow, and has an immense line of frontier. Except in the North, the frontier does not lie upon a natural obstacle. The military defence problem is a very difficult one. The capital, Prag, lies well away in the N.W. corner

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of her territory. All the old communications run from North to South, radiating from Vienna and Buda-Pesth, and to get from West to East in Czecho-Slovakia is now a lengthy business and the administration of the country is rendered difficult in consequence. To build new communications will take time and money, which is now not available in large quantities. In the Extreme Eastern corner of Czecho-Slovakia lies the territory of Ruthenia. From Ruthenia, the rivers flow down in to the great plain of Hungary, and the Ruthenian mountaineers are used to cutting their wood in the winter and floating it down to the plain, where there are no forests, in summer-time. They used to remain for the harvest and return to their mountains with money or corn to enable them to live in the ensuing winter. But now they belong to a different state and cannot have free access to Hungary, for there are restrictions of all kinds in front of them. Czecho-Slovakia has no access to the sea, other than by the Elbe, which flows through German territory. It cannot be imagined that this route would be available should there be disturbance in Germany, and what an economic lever lies in the hands of the German Government should it desire to apply pressure to Czecho-Slovakia. Czecho-Slovakia has given freedom to the three nationalities Czechs, Slovaks and Ruthenians, but can she render the Ruthenians contented if they feel that their economic situation is being impoverished through their being cut off from their proper commercial outlets?

In the capital of a country are collected both the political and commercial direction of affairs. It is the great nerve-centre of the state. The Turks have shown their appreciation of this fact by their desire to make Angora their capital and not Constantinople. The Soviet Government of Russia has transferred its seat to Moscow from Petrograd. Both Angora and Moscow are safe from military action, be it on the ground or in the air, owing to their remoteness from the frontiers. Warsaw is well situated in Poland. Vienna, Belgrade and Bukarest are not ideally situated.

The industrial areas of Silesia and the Ruhr, situated as they are at the limits of the German frontiers, must always be vulnerable to military action.

But, it is in the question of ports that we find the greatest violation of geographical principles. Geographically, Serbia should have a port in the North and South. Yet neither Fiume nor Trieste belong to her. Poland has no port and naturally desires Danzig. Austria and Hungary have no access to the sea and depend upon the precarious internationalisation of the Danube. It is impossible to believe that say, Hungarian goods would be able to go up or down the Danube in case of war between say, Roumania and Bulgaria, and even if no war arrives to stop the traffic, international tribunals are notoriously lengthy, and trade may be ruined by even slight delays in transit. The question of the necessity of a port is exemplified in Lithuania. She has been given a narrow strip of territory on the coast, where it might be possible to construct a port. But, in the present bankrupt

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state of Europe, where is the money coming from for such construction and for the railways to serve the new port? It is hardly an economic proposition to prevent Riga and Memel from serving the districts for which they are the natural outlets. There was an example of such uneconomic action in German South West Africa, where Germany constructed a port, Swakopmund, some 25 miles north of the natural outlet Walfisch Bay, which belonged to Great Britain. But then, Germany was far from poor at the moment.

If there are not sufficient raw materials in a state to make it self-supporting there is all the more reason that it should have colonial possessions and free communications to bring them in. Germany has lost her colonies and much of her industrial territory. Should there be further secessions, there is great danger that Prussia might be left without proper resources to maintain a large and increasing population. Few countries are desirous of accepting German immigrants owing to their behaviour during the late war, and misery brought on by lack of resources may bring on war once more.

As regards the contentment of minorities, which is so important, the situation in Central Europe has been rendered very difficult by the animosities aroused in the late war. In many villages it is possible to find one side of a street of different nationality to the other, and in some districts the townspeople are different to the country people. Some of the new states have extended their frontiers to include the most distantly situated of their nationals, and in so doing have included a large alien population. Denmark has realised the importance of this by not absorbing a larger portion of territory across the old Southern frontier and has avoided political difficulties in consequence. There are great advantages in having a homogeneous population such as France has, but where there are alien subjects, the only method of rendering them reasonably content is by granting them as quickly as possible political and linguistic freedom of the most elastic nature. This question is arising more and more amongst the coloured subjects of the great states. There can be no doubt that the same freedom must be granted to these nationalities as soon as they are ready to profit by it. To follow any other policy is to court an internal rebellion.

The situation in Europe is now very similar to that prevailing after the Napoleonic wars, when many subject nations were liberated. Matters are, however, complicated by the commercial interdependence of states due to the increased demands for comfort put forward by all grades of society. How is the present bankruptcy to be bettered, and how is the existing situation to be maintained so that there may be a minimum of quarrels and wars?

The solution seems to lie in the formation of groups of states, linked through mutual interest or kindred nationality and united in a Customs Union such as was evolved by Germany. It cannot be denied that Luxembourg benefited by being within the German Customs Union. Anything which tends to prevent intercourse between nations must be a factor towards misunderstanding, and the Customs barriers

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erected by the new states in Europe are more than an inconvenience to commerce, besides being an intolerable burden as regards the payment of salaries to the host of officials maintained by each. The inclusion of the Baltic States in the Russian Customs Union would go far to solve the problem of outlets for Russia and remove a source of irritation. If some such solution is not arrived at, the masses of Russia will not allow such a locking of their legitimate doors to continue. Is a Customs Union of Czecho-Slovakia, Yugo-Slavia, Hungary and Roumania an altogether Utopian idea?

The daily newspapers are filled each day with news of happenings in various areas in Europe. The soldier should study these danger points and see for himself how they are developing, whether towards peace or war.

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FRENCH ARTILLERY DOCTRINE.

General Herr's book on French Artillery—"L'Artillerie: ce qu'elle a été: ce qu'elle est: ce qu'elle doit être."

Berger-Levrault, Paris. 1923.

Reviewed by

BRIG.-GENL. W. EVANS, C.M.G., D.S.O.

Abbreviations used:

A.L.	Artillerie lourde.	
A.L.G.P.	,, ,,	à grande puissance.
A.L.V.F.	,, ,,	sur voie ferrée.
R.G.A.L.	Reserve générale d'artillerie lourde.	
R.G.A.	,, ,,	d'artillerie.

MANY books have been written about artillery—its pre-war doctrine, the evolution of ideas during the war, etc., all enlightening to a certain degree. Now a book has been published entitled "Artillery, what it has been, is, and should be" by General Herr of the French Army, whose position gives it quite exceptional importance.

General Herr perhaps had more opportunity than anyone in the world of becoming conversant with every aspect of the artillery problem during the war, and after.

Step by step he rose from being an artillery brigade commander to the commands of an infantry division, an army corps, an army detachment, until as Inspector General at Headquarters he became virtually "Chief" of the French Artillery.

"At the commencement of the War the artillery was represented at French G.Q.G. only by a comparatively junior officer holding a subordinate position in the 1st Bureau—at its close there was an Inspector-General with the rank of Corps Commander and an office of his own. The credit for the change must be given to General Pétain, who realised soon after his appointment as C. in C. that the artillery had become too important and too complicated a portion of the Army to be left without a responsible head at G.Q.G. But it is understood that the change was not made without strenuous opposition from the General Staff, who, in France as elsewhere, resisted as long as possible the creation of such an office, and then the exercise of any real authority by its holder."

It seems curious that when it was recognised that the enormous increase in guns transformed the artillery into a weapon that could "conquer positions," this reluctance should have manifested itself.

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"Be this as it may, General Petain, with whom General Herr had served during stormy days at Verdun, turned to him to "run" the artillery, gradually increasing his powers until, as Inspector General with the rank of Lieut.-General, he had control not only of all the artillery in the field, but also of the technical Committees at the War Office, and the organizations behind the line.

It will thus be seen that General Herr writes with an authority and a practical knowledge which renders all that he has to say on the subject of artillery worthy of our most serious attention."

Perhaps the greatest lesson of the war is that once it was found that artillery of the field army must comprise a powerful and numerous heavy artillery, centralisation of command became a necessity if the full "development of maximum force at decisive points, at the required time" [1] was to be attained.

In a book entitled "G.Q.G. Secteur I" by Jean de Pierrefeu an anecdote is told of a certain Lieut.-Colonel Carence, who was considered one of the most knowledgeable of artillerymen in the Army. He had always been an ardent advocate of heavy artillery and previously to 1914 had been at the War Ministry where he was the life and soul of a campaign in favour of the production of more guns. One day early in 1915, disheartened by the fact that G.Q.G. did not pay sufficient attention to these problems, he demanded an interview with Joffre who was an old friend of his.

Joffre encouraged him to speak out and listened to him for half an hour, without saying a word.

When finally Colonel Carence having put his arguments forward from every point of view ceased talking, Joffre merely said to him, with a friendly pat on the back, "Ce sacré Carence, il a toujours beaucoup aimé l'artillerie. C'est très bien, ça," and dismissed him.

On the other hand one finds in this same book that when Petain went to G.Q.G. in 1917 the question of the use of artillery had become a burning question. Here is the story.

PETAIN. Amongst the other cases that occupied the General's attention one must not forget the organization of the artillery.

General Buat, Commanding the A.L.G.P., with headquarters at Pierrefonds was often to be met with at G.Q.G.

Nearly every day one saw him arrive at G.Q.G. to talk to General Pétain.

Placed at the head of the A.L.G.P. by General Nivelle, he had retained the confidence of his successor.

His energy, his sound judgment on the means needed for victory, made him one of the most valued assistants of the high command.

A good speaker and writer, Buat liked stating his views to those whom he deemed capable of being interested in them. While he spoke he would go to the table take a pencil and paper and mechanically make maps, or tabulations of what he was discussing.

* * * * *

[1] "Artillery Training," Vol. III., 1921, p. 21.

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General Buat had from a very early date been struck by the obvious necessity to create the element of surprise.

But on fronts where no flanks existed, constantly under the observation of an enemy equipped with all the means for getting information, manœuvre seemed impossible.

General Buat, as an artilleryman, thought that we could obtain it by use of the gun.

On a wide front he would dispose several concentrations of artillery, fed by reserves. Over and above this he would put at the disposition of the high command a general reserve of artillery of all calibres. Then at intervals of a few days fairly strong bodies of infantry should make various demonstrations under cover of artillery fire, right up to the moment of attack, so that the enemy should be left in uncertainty as to where he should put in his reserves. Then by pulling in the general reserve of artillery in a suitable sector, success might be obtained.

This ingenious plan naturally meant increasing the number of guns, and the amount of ammunition, and above all a general equipment of the front.

If this were expensive in money, it had the advantage of being economical of human lives.

General Petain, doubtless because he was an infantryman, did not condemn as absurd the ideas of an artilleryman. Strongly supported by him, General Buat undertook the construction of extensive works behind the front. Sidings for A.L.V.F. and positions for artillery of all natures.

As gun construction proceeded, so regiments of heavy artillery were formed, and heavy tractor drawn guns manufactured. Also the "artillerie legère portée" was organised—field guns carried on lorries with a view to extra rapid movement. The German offensive occurred before General Buat's tactics could be utilised, but General Buat returned to G.Q.G. on the eve of July 18th.

Now to examine the book itself.

It consists of 340 pages and is divided into four parts. Perhaps the best way of reviewing it is to give the index and then to translate or précis certain portions.

PART I.

The part played by artillery in the War 1914-1918.

Chapter I.—Situation at the commencement.

I. The French Artillery in 1914.

II. The German Artillery in 1914.

III. The question of heavy artillery.
The light howitzer.
The Committee on new guns.

IV. Anti-aircraft artillery.

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Chapter II.—Artillery during the war.

I. Operations before the trench warfare period.
II. Trench warfare 1915.
First phase—minor operations.
Second phase—major operations.
III. Trench warfare 1916.
(a) Verdun: first phase from February 21st—July 1st.
(b) French offensives: The Somme (July—November).
Verdun: second phase (August—December).
IV. Trench warfare 1917.
1. The attempt to break through the front. The great spring offensive.
2. Attacks on limited objectives (July—December.)
V. Resumption of moving warfare.
1. The great German attacks.
2. The French offensive: preparation for the offensive; the position as regards artillery on July 1, 1918.

Chapter III.—The French Artillery at the time of the Armistice.

(a) *Organization:* The artillery belonging to higher formations; artillery in the hands of the commander-in-chief; strength of the artillery; artillery commands.
(b) *Material.*
(c) *Employment:* from the tactical point of view; from the technical point of view.

Chapter IV.—Evolution of the German artillery during the war.

PART II.

The artillery needed for war.

Chapter I.—Material. Tactical considerations governing the composition of artillery.

(1) The immediate accompaniment of infantry: The weapon of accompaniment.
(2) Direct support of infantry.
(a) Light gun.
(b) Light howitzer.
(3) Destruction of the enemy's organised forces.
(4) Destruction of material.
(a) Medium howitzer.
(b) Heavy howitzer.
(c) Long range gun.
(d) Super-heavy guns and howitzers.
(5) Counter battery.
(6) Interdiction.
(a) Medium range gun.
(b) Long range gun.
(c) Very long range gun.

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(7) Anti-tank combat.
(8) Anti-aircraft combat.
  (a) Attack on high flying aircraft.
  (b) ,, ,, low ,, ,,
(9) Heavy artillery on railway mountings.
  (a) Heavy howitzers.
  (b) Guns of great range.
  (c) Guns of exceptionally long range.

Chapter II.—Qualifications guns and mountings should possess.

(1) Ballistic qualities.
  (a) Range.
  (b) Accuracy.
(2) Tactical.
  (a) Mobility.
  (b) Field of fire.
  (c) Rapidity of fire.
  (d) Power of destruction: Projectiles—Shrapnel shell—High-explosive shell—"Special" shell—Fuzes.

Chapter III.—The employment of artillery.

Surprise.
Concentration.
Depth.

Chapter IV.—The question of the quantity and proportion of material strength to numbers of men.

Chapter V.—Organization and command.

(1) Organization: divisional artillery; corps artillery; army and army group artillery; artillery with cavalry; general reserve of artillery; anti-aircraft artillery.
(2) Command.
(3) Subsidiary services.
(4) Aircraft for artillery observation.

PART III.

The artillery needed in peace.

Chapter I.—The guns that should be kept.
Chapter II.—Technical studies—construction service—personnel—technically trained officers or military engineers.
Chapter III.—Industrial mobilization.
Chapter IV.—Organization, mobilization and instruction.

PART IV.

The situation in 1922. Ch. I.—What has been done in France and abroad since the war. Ch. II.—Conclusion.

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PART I.

The headings of the chapters dealing with the development of the artillery during the war explain themselves.

As with us, new divisions had to be equipped with field artillery and heavy guns and howitzers manufactured, but unlike us, who had at least C.R.A's of divisions, the French were slow in organising commands and staffs able to cope with the increase. The chief lessons to be learnt from this part of the book are concerned with the formation of (1) the general reserve of heavy artillery, (2) its amplification into the general reserve of artillery, and (3) the "artillerie portée," corresponding to our army field artillery. General Herr goes very fully into the details concerned with the above.

It will be seen that when the general reserve of heavy artillery came into being, General Petain took steps to ensure that the work of the artillery should be carried out on the same lines, by appointing an Inspector General of Artillery instruction, of high rank (Lieut.-General) and making him responsible for the training and instruction of the personnel of the whole of the artillery.

At the same time a Central Artillery Committee (C.C.A.) sitting at Paris was also formed to study new methods, improvements, etc. The I.G.I.A. was its president and through this committee was in touch with the industrial side, while equipped with a proper staff at G.Q.G. he was in touch with the fighting side of the artillery question.

When the general reserve of artillery (R.G.A.) came into being, the I.G.I.A's department became that of the Inspector General of Artillery, with the same C.C.A. at Paris to help him, and with very extended powers.

Amongst his other duties he assumed the direct command of the general reserve of artillery.

Page 71.—Creation of the R.G.A.L.

In pages 70-71 we read of the development of the A.L.G.P. (artillerie lourde à grande puissance) and the A.L.T. (artillerie lourde à tracteurs) and the rather unfriendly surroundings in which they worked.

In December, 1916, when the Allies began to make plans for attacks on various sectors of the front from Dunkerque to the Carso, it became evident that to get full value from the strategic mobility of these guns, they must be grouped together.

When Nivelle became C. in C., inspired by Gén. Buat, he grouped the A.L.G.P. and A.L.T. into one command, thus forming the General Reserve of Heavy Artillery.

Gén. Buat was appointed commander with rank of Corps Commander (Lieut.-Gen.). The R.G.A.L. was divided into three divisions each under a general (or colonel).

Page 98.—The General Reserve of Artillery.

In pages 98-100 General Herr draws attention to the suspicion which the creation of the R.G.A.L. aroused.

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The tractor drawn heavy artillery had reaped great advantages by being attached to the R.G.A.L.

Not so the foot artillery, and the horse drawn heavy artillery who had hitherto been under G.Q.G. but without being grouped together under one commander.

This had militated very much against their efficiency and they now were added to the R.G.A.L. which in an instruction dated 26th January, 1918, became the General Reserve of Artillery (R.G.A.).

The R.G.A. comprised all the artillery that did not belong to the higher units.

It was divided into 4 divisions—

1st	Division.	A.L.G.P.
2nd	,,	Tractor and horse drawn heavy artillery.
3rd	,,	Marine artillery.
4th	,,	Trench and Foot artillery.

General Herr on page 100 details the excellent results obtained by the creation of an I.G.A.. Amongst these were :—

Standardisation of methods.

Improvement in scientific methods.

Increase in range and power of guns (particularly as regards the 75).

Increase of mobility (by use of caterpillars, use of light tractors for the *artillerie portée*.

Tactical handling advanced also.

In defence, *depth* was made use of, in attack, *surprise* was attained by lessening or doing away with preparation.

Power was obtained by the methodical use of concentrations and *exploitation* by the mobility of units, and the flexibility of their manœuvre.

Page 101.—The author tells us how the *artillerie portée* came into being.

Commencing with the winter of 1914-1915 it became necessary to reduce the field artillery regiments of the corps artillery to 2 groups of 3 batteries, to enable the new divisions to be equipped with field artillery.

This held good till August, 1917. But it became more and more necessary to reinforce the artillery of attacking divisions; rapid reinforcements of fronts attacked by the enemy were necessary : some means of supplementing the artillery covering thinly held sectors had to be found; finally a scheme of relieving 75 batteries for rest had to be introduced.

The C. in C. therefore decided that the 75's of the corps artillery should be used for these purposes.

Meanwhile the supply of horses was steadily decreasing, so that naturally mechanical transport had to be made use of.

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It was found that this certainly increased their *strategical mobility* and enabled them to make the rapid moves, and cover the great distances that their rôle of reinforcing artillery demanded.

A third group was added to these regiments to put them on the same footing as divisional artillery regiments.

So this measure, due to shortness of horses and forage, proved to be of enormous value, and the *artillerie portée*, which started as a make-shift, became a most important strategic weapon.

Chapter III.—C. Employment of Artillery, gives a resumé of pre-war doctrine, and its evolution during the war. I give an abridged translation.

Translation.

"We saw in Chapter I what the principles of the employment of artillery were.

Here is a brief resumé of them :—

From a technical point of view : Fire was observed shot for shot by direct observation, which precluded on the one hand long range fire, and on the other hand, surprise.

In consequence no interest was taken in scientific methods. The possibility of destroying protected targets was not believed in; besides the 75 which was practically the only weapon used by the artillery of the Field Army obviously was not powerful enough for that purpose; neutralisation was all that was expected, and that with small expenditure of ammunition by firing short and violent bursts of fire with long intervals of silence.

From a tactical point of view : The preliminary artillery duel could give no definite result ; therefore it should not be sought.

Artillery did not *prepare* infantry attacks, it merely supported them.

The quick-firing 75 m/m gun was sufficient for all the tasks of the battlefield : the need for a strong and powerful heavy artillery had not made itself apparent. The individual power of the 75 was considered sufficient in the majority of cases. True concentration of fire adds to the effect up to a certain point, but it is not easily obtained with guns of short range, which can only open effective fire after registration by direct observation. The guns were used in small groups working almost independently of one another. The means of communication at the commander's disposal were so uncertain that hardly had the artillery got into action than they became independent of his control. Therefore it was necessary to decentralise the tactical conduct of fire, and massed action was impossible.

As we have seen in Chapter II the lessons learnt from experience very quickly modified these ideas, and at the time of the Armistice, the employment of artillery was ruled by the following principles :—

From the technical point of view :

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Artillery has become more and more dependent on the scientific preparation of fire in which one seeks to eliminate in advance, by carefully calculated corrections all the causes that may affect the shooting. Meteorological sections give all the necessary atmospheric data; calibration eliminates the effect of wear of the gun, and enables all the guns of a unit to shoot alike; only carefully allotted propellants are used; mathematical instruments make it easy to work out the necessary calculations; range tables have been revised, made more accurate, and amplified; topographical instruments allow of the positions of batteries and targets being marked accurately on the map.

Thanks to all these improved methods artillery is able to open, without preliminary registration, immediate and effective fire.

The fact still remains that direct observation is the only guarantee we possess against the factors that affect the shooting, against faulty instruments, or errors of calculation.

If then, circumstances admit of it, an experienced battery commander who can rely on his men should never neglect to go and verify the shooting of his guns, by direct observation. Considerable efforts have been made to organize direct observation.

Ground observation has been provided with reliable means of communication which enables O.P's to be as far as necessary from battery positions, or command posts; it has been provided with accurate instruments and scientific methods; permanent observation agencies have been organized for all natures of gun by the Command. Intelligence sections (ground observation, and sound ranging sections —S.R.O.T. and S.R.S.). Observation balloons have been considerably improved, and their number increased, they can be put up higher, and they are steadier in the wind.

Finally, and most important of all, observation from aeroplanes has made remarkable progress.

There are more machines, and they are handier; their wireless enables them to communicate with batteries, which in their turn can talk to them by means of ground strips.

A new method of registration by the observation of the mean point of impact of a group of rounds is now made use of, and is satisfactory.

Finally a school for balloon and aeroplane observers has been opened at Sézanne, and provides armies with trained observers.

From the tactical point of view:

Artillery has learnt that it can only attain appreciable effect when used in mass. Isolated rounds have no effect. Nor does a moderate expenditure of ammunition produce any appreciable effect; only an avalanche of shell has effect. From a moral as well as a material point of view time plays leading part: this avalanche of shell should fall on the objective in the shortest time possible.

However great the improvements in material, it is necessary in order to obtain the desired ammunition expenditure in a short space of time, to group large numbers of guns together; important tasks demand massed action. To get this massed effect, if disorder is to be

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avoided, it is necessary to place the whole of the artillery under one single commander, who should never consent to the detachment of portions of his command to smaller units except in case of absolute necessity, and only for a definite task and for a limited period.

The first principle, then, in artillery tactics is its employment in mass. There are certainly occasions when by the force of circumstances decentralisation becomes necessary; but every effort must be made to again centralise the command as quickly as possible.

The increased rate of fire, the longer ranges, the widening of the field of fire, the possibility of opening fire without registration have increased the flexibility of artillery fire to an enormous degree. Nowadays, artillery can like the other arms and for the same reasons comply with the principle of the concentration of its efforts, which in its case consists in attacking in turn with the strongest forces, the various objectives allotted by the command.

Instead of dissipating its action by individual action in all the minor details of a battle, the principle is to use artillery in mass, concentrating its fire on certain definite zones, and opening on them devastating and sudden bursts of fire.

In preference to all other methods artillery works on big lines."

PART II.

Chapter I.—Tactical considerations.

Gen. Herr points out that the late war of 1914-1918 was position warfare, sandwiched between two periods of open warfare. No one can tell what the next war will be.

"However, although this goes against arguments one often hears nowadays, it is as well to admit that it will again consist of periods of stabilisation and periods of movement. The actual conditions in which the struggle will commence, the delays of military mobilisation, the requirements of industrial mobilisation, seemingly will make for a period of stabilisation at the start.

Later, during active operations, the necessity of the weaker side to have recourse to entrenchments, or perhaps the desire to await their own or allied reinforcements will on different occasions produce position warfare. Besides, the attacker, however much he desires rapid offensive action, will be held back by the necessity of concentrating all his means for attacking a fortified position. It follows thus that willy-nilly temporary stabilisation will occur while reserves and material are brought up. War then would appear to move in fits and starts, preparation for battle imposing the necessity on both sides for a temporary occupation of a definite line, the battle itself consisting of a succession of slow movements, with small results and lasting a long time, finally the exploitation of success perhaps producing a period of rapid moves until a fortified position is again encountered.

It is also wise to acknowledge that doubtless new conditions will arise that will modify the nature of position warfare and the characteristics of movement.

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Moreover, some flash of genius may produce a new invention which will totally revolutionize armament.

The evolution which commenced during the last war will continue during peace. Not so rapidly of course, as neither daily experience nor the spur of necessity are there to hasten it. . . . .

The above considerations are stated to justify the method we should follow; this is to base our deductions and our proposals on the most recent lessons of the last war.

From these lessons, one might *from the artilleryman's point of view*, visualise fighting as follows:

The two opposing armies move forward to battle, unless one of them elects to await the shock on a selected and previously prepared position. Directly movement commences, or before if the points of assembly of the two armies are within range of aircraft, columns on the march, cantonments and bivouacks are reconnoitred and bombed by hostile aircraft. The necessity at once arises of keeping them off by gun fire. Hence the first artillery to come into action will be the anti-aircraft artillery.

Next, columns on the march come within the zone reached by long range guns; to protect the march of the troops and assure its continuance, these guns must be engaged by weapons of similar nature, i.e., *long range artillery*.

As the distance lessens, columns come under increasing artillery fire. Some of the hostile guns will be in the open concealed by crests, others in emplacements, and all disposed in depth.

These guns must be engaged and we should be capable of silencing them, whatever their distance and degree of protection may be.

The enemy has strengthened the position he occupies, and covered it with subsidary defences. Our infantry cannot approach such positions until the artillery has previously rendered them ripe for assault, by creating passages through the outlying defences, and annihilating the flanking organizations, in a word *destroying everything that could stop the advance*.

This artillery preparation completed the infantry move to the attack, and all the enemy weapons that have escaped the preparation are concentrated on them.

Artillery must *protect* them from this danger, and *support* them incessantly by neutralising the action of these weapons, either by a rolling barrage of fire and smoke, or by concentrations on areas harbouring the enemy.

During their progress the infantry are held up by obstacles which have not been destroyed by the artillery preparation, and machine guns that the guns directly supporting them have not reduced to silence.

The guns who have carried out this work are too far off, and communications too precarious, for the infantry to be able to obtain their co-operation quickly. Only guns which accompany the infantry and are under their direct command can intervene at the right time.

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Their *artillery of accompaniment* must clear the way for the assaulting troops.

The defender now attempts to check the progress of the victorious troops not only by the fire of all natures of weapon, but by counter-attacks supported by tanks.

These must be at once engaged by guns with a very rapid rate of fire, and great penetrating power, which form the *anti-tank artillery*.

From the commencement of the battle, and while it is going on, the enemy is pushing his reserves towards the battlefield. He has to supply them with ammunition, food and material. To hold up, or even only to render difficult all the traffic behind the front is an effective means of paralysing the enemy and lowering his moral. This is the task of the *long-range and very long-range* artillery who bombard ceaselessly the main lines of approach, important railway stations, ammunition parks, etc. This artillery also tries to interfere with the hostile command by engaging headquarters, important communication centres, and destroying observation posts. When finally the enemy is in retreat this same artillery sweeps the roads on which they are retiring, sowing disorder and panic in his columns, while the more mobile guns push on with the pursuing infantry across country or on the roads as their powers of manœuvre admit.

This appreciation has enabled us to picture, step by step, the principal tasks which devolve on the artillery in battle.

These may be defined under the following headings :—

Immediate accompaniment of infantry;
Direct support and protection of infantry;
Destruction of the enemy's organised forces;
Destruction of concrete objects;
Counter battery;
Interdiction;
Anti-tank combat;
Anti-aircraft combat."

General Herr again lays stress on the initial mistake on the part of the French in thinking the 75 sufficed for all needs of the battlefield.

He points out that each of these tasks requires its own special weapon, and that the composition of an artillery system needs careful thinking out in order that these tasks may be thoroughly and economically carried out.

He next examines the qualities that each weapon should possess.

For the *immediate accompaniment* of infantry he deduces that the gun may be :—

On a self propelling carriage.
On a wheeled carriage carried or drawn by a light tractor.
He rejects the first for the following reasons :—

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The motor remains in action and the chances are is quickly destroyed; it is less handy on the march and in action than a gun on wheels; lastly it is costly, as the motor has to be made as well as the gun, and cannot be used apart.

He considers that as the gun should be able to engage targets behind epaulments, or crests, it should be a howitzer.

As it has to move close up to the infantry and destroy objects that reveal themselves unexpectedly it would never have to fire at ranges beyond 2000—2500 m. To ensure accuracy at these ranges, a maximum range of 4000 is sufficient.

Rapidity of fire should be as great as possible, and this is easily obtained by constructing a semi-automatic gun and using fixed ammunition. Now this means, if alternative charges are to be used, that each gun must have several kinds of ammunition. A light caterpillar tractor should take the ammunition to the gun position—this might easily be the tractor that had brought it into action, which would work between the gun position and the nearest road on which are the ammunition lorries.

(In a footnote to this the author says that fixed ammunition is not a necessity.)

Anti-tank guns.

Special guns with very high muzzle velocity (at least 2100 f.s.) with delay action fuze. Calibre about 75.

"Such a weapon must be heavy, about 4 tons, for it must be armoured itself, to a certain extent, and it must be mobile for manœuvre, which means it must be mechanically propelled.

The anti-tank gun will thus itself be a tank.

But this weapon, while fighting in close touch with the infantry, will not be called on to risk itself as near the front line as the accompanying gun and the infantry tank; hence much or even all of its armour might be dispensed with, retaining only a gun-shield proof against armour-piercing machine-gun bullets.

Anti-aircraft.

Aviation is bound to develop considerably in the future; it will become a more and more dangerous opponent of troops on the ground, both by reason of the accuracy of its own machine gun fire, and its bombardments of high explosive and gas shell, and by the moral effect . . . . .

Defence against hostile aircraft mainly is the task of our own aircraft. Aeroplanes however cannot be always in the air; their action most effective at certain moments may be nil the moment after, and it is most necessary to compensate for their intermittent activity.

This is the task of anti-aircraft guns . . . . .

As one can forecast that the number of aircraft will constantly increase, it is logical to add to the numbers of anti-aircraft guns. Some people think that, as there can never be enough A.A. guns to

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engage all the aeroplanes that appear simultaneously on an important battle front, all natures of gun should be able to share in this task.

This is a very reasonable wish and it is a thousand pities that it cannot be acceded to. Unfortunately it cannot; fire against aerial objectives demands from guns many qualifications which make them complicated, etc., and which necessitate a numerous specially trained personnel.

* * * * * * * *

Against low-flying aircraft a large bore machine-gun is essential. . . . .

It is possible to foresee a "multi-tube" gun being manufactured for this purpose. From such a gun a very much higher rate of fire (100—120 rounds per minute) could be obtained than with a single gun. The projectile would be a high explosive shell with an extra sensitive fuze that would be set in action by the fabric of an aeroplane, and which should have a simple arrangement to prevent it acting after a given range, or when reaching the ground. Such a fuze has already been nearly arrived at.

NOTE.—If ordinary guns are not suited to engaging aircraft, anti-aircraft artillery on the other hand can very well engage ground targets. . . . . their great lateral field of fire makes them very effective as anti-tank weapons.

Chapter III.—Surprise—Mass—Depth.

We have seen how improved methods have made *surprise* possible. The author next once more lays stress on the fact that *artillery is only effective when employed in mass.*

"This necessitates grouping large numbers of guns under one single commander, who directs and co-ordinates their united efforts. Not only has he to settle the general conduct of the battle but often must decide certain important details: the organization and grouping, deployment and disposition in depth; moves; supplies; successive tasks; objects to bombard; etc., if by individual action, or in co-operation with other arms, specially the infantry in carrying out a tactical manœuvre.

In short he must direct *manœuvre by fire just as he does manœuvre by movement.*

The fact of dividing divisional artillery into artillery of direct support by organizing a number of groupings of batteries, corresponding with the numbers of regiments in the front line and of allotting accompanying guns to battalions, need not contravene this principle.

Though each of these groupings primarily supports its own infantry regiment, tactical liaison should be maintained, so that it can be functioned when necessary by the artillery commander. The accompanying guns on the other hand remain directly under battalion commanders."

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General Herr draws attention to the figures he gave in Part I on the numbers of guns employed in the great battles.

From 5 batteries to 1 kilo in 1914

There were 40 ,, ,, 1917

in the attacks on positions, and during the 1918 open warfare an average of 20 batteries.

General Herr considers that, unless some new arm is arrived at to supersede artillery in the next war these numbers will be exceeded.

Depth.

Continuity of artillery support to infantry can only be guaranteed by artillery disposed in depth.

This requires of guns great range and tactical mobility. Range enables guns to keep up their fire in support of infantry without too frequently changing positions. Mobility facilitates changing position when necessary.

Chapter IV.—The problem of quantity.

General Herr discusses moral effect, and actual losses caused by artillery fire.

To the objection that the enormous increase in artillery material was due to stabilisation and that it would be impossible to use all this material in open warfare, it might be answered that it was not stabilisation that brought about an increase in guns—it was on the contrary insufficiency of guns that drove the opposing armies to ground, and immobilised them for four years in trenches.

General Herr then says that the case that must naturally interest the French most is the "*next war against our enemy of yesterday*"

He finishes the chapter by giving the details of what artillery he considers necessary for an army of 100 divisions. He gives the details of a map problem worked out "on the other side of the Rhine" showing their ideas on the quantity of artillery necessary.

The scheme was the attack of a division (in conjunction with others) with the object of breaking through a position.

Divisional artillery :—

Light artillery	5	groups
Heavy ,, ...	3	,,
Auto-canons	1	,,
	9	,,

reinforced by the whole of the artillery of a second line division— = 9 groups.

Part of the corps artillery :—

1 Regt. Light artillery	3	groups
1 ,, Heavy ,, ...	3	,,
Heavier guns	3	,,
	9	,,

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Artillery from the general reserve :—

1 Regt. Light artillery	2	groups
2 ,, Heavy ,, ...	4	,,
Heavy mortars	1	,,
	7	,,

Total 34 groups.

This works out (taking into consideration other guns = 2 or 3 groups that could fire on this front) 36 to 37 groups = 110 batteries. Front attacked 2500 m. Number of guns per kilo 47 batteries.

Chapter V.—*Organization and Command.*

General Herr points out the impossibility of furnishing all the higher units with their own artillery—so that the whole question turns to organization of reserves.

A division being the fighting unit with definite and limited tasks, must have its own artillery but requires no reserve.

The Corps being the *battle* unit, has under its orders several divisions which may act simultaneously, or successively, or may be called on to support neighbouring divisions.

Therefore army corps should not only have their own artillery (heavy artillery for counter-battery and interdiction) but also a reserve of field artillery organised on the same lines as the divisional artillery, with which it can reinforce any particular division, or which it can, if preferable, employ doing counter-battery work, or interdiction within the limits of its range.

Armies, and groups of armies, are more organizations of command than fighting organizations. Their task is, not to use themselves the means placed at their disposal, but to allot these means to subordinate units.

Therefore there is no need for them to possess their own artillery. The real artillery reserve is the general reserve belonging to the commander-in-chief, and this exists so that economy of resources may be preserved, without loss of power.

This reserve should contain not only all the natures of artillery definitely belonging to units, but all the weapons required for special missions.

Given the principle of the reserve being admitted, it remains to decide how the artillery belonging to the various échelons should be constituted, what natures of gun they should comprise, and their strengths.

Divisional artillery is only concerned with the tasks that fall to its own division, i.e., primarily the destructions in the zone of action of the division and the support of infantry. Corps artillery deals with the more general tasks concerning the whole corps, i.e., more particularly counter-battery, and interdiction. Army artillery undertakes tasks for the benefit of all, and action at very long ranges. The allotment of guns to these three échelons corresponded exactly to this allotment of tasks. . . . .

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Divisional Artillery—

"*Artillery of accompaniment.* This extra-mobile artillery, able to move and fight in the same zone as the infantry should have an organization corresponding to that of the infantry it has to accompany. It therefore will comprise a group of as many batteries as there are regiments in the division—i.e., three batteries in a division of 3 regiments. In order to be always capable of mantaining in the line a sufficient number of pieces, batteries should have six guns.

The question arises as to whether these batteries should be manned by infantrymen or gunners. Each solution has its advocates. It may be stated in favour of the former that very close co-operation is necessary between the infantry and its weapons of accompaniment and that this perfect co-operation can only be realised by the moral and material liaison that is naturally bound to exist between fractions of the same unit, bearing the same number, sharing at all times the same existence, living in constant touch, and finally under the same commander.

Without denying the soundness of this argument the advocates of the other solution consider that the tactical employment of these weapons of accompaniment demands that the personnel of these batteries should belong, both officers and men, to the artillery rather than the infantry; that training and technical instruction, conducing to efficiency will be better if they belong to the divisional artillery; they add that the experience of the war has shown that liaison is very quickly established between the infantry and the artillery that support them in the normal way; finally the moral effect produced on the infantry by seeing the gunners working in close contact with the enemy, and sharing in the bitter struggle that they are carrying out, is a most excellent thing. Personally I am of opinion that every argument is met by drawing the personnel from the divisional artillery, and making them live entirely with the infantry once the division is engaged. In periods of rest, they rejoin the D.A. who administer them, train them and refit them. For this reason I include in this work, the artillery of accompaniment as forming an integral part of the D.A."

Artillery of direct support—(précis).

The universal opinion at the end of the war was that there should be 4 groups. The real weapon of direct support is the light howitzer—A gun is however also needed—The French suffered throughout the war from the absence of a light howitzer.

The Germans had a mixed group in the heavy artillery and often tried it in the field artillery with good results.

The French do not care about the mixed group—On big lines the group is the smallest unit—the battery merely a shooting machine.

The D.A. should comprise :—

2 groups of howitzers.
2 ,, ,, light guns.

Heavy artillery of the Division.

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The 15·5c/m howitzer proved too unweildy in the moving battles of 1918 and should not belong to the D.A.

The 105 gun which is sufficiently mobile to follow the movements of the infantry should replace the 155 howitzer—In 1918, 105's were frequently allotted to divisions with good results.

Thus the composition of the D.A. would be :—

Artillery of accompaniment :	1 group of 3 six-gun batteries (mechanical).
Artillery of direct support :	2 groups field guns.
	2 ,, ,, howitzers.
Heavy artillery	1 ,, 105 guns.

all horse drawn.

Corps artillery should consist of :—

4 groups	155 Hows.	mechanical :
4 ,,	155 guns	
2 ,,	field hows.	all horsed.
2 ,,	field guns	
1 ,,	105 guns	

Army artillery :—

This will be allotted from the R.G.A. and armies will divide it it up amongst army corps—only directly employing exceptionally powerful and long range guns.

Artillery with Cavalry.—Should have, per division, one group light guns, one group of howitzers.

Cavalry are called on to fight on foot, therefore require the two natures of artillery, either horse drawn, or by light caterpillar tractors capable of crossing any country at speed.

Cavalry corps, if constituted, need not possess their own artillery. The R.G.A. should furnish it as necessary.

General reserve of artillery.—A fifth division might be added consisting of foot artillery reserve and supplying trench artillery (if such exists), and guns of old pattern that may be made use of, and any guns of special pattern, not included in the four divisions.

II. The Command.

General Herr again draws attention to the fact that the experience of the war only with difficulty eradicated the old pre-war idea that artillery commanders were only glorified I.O.M's, and ammunition column commanders requiring neither great experience nor big staffs. In short, the tactical handling of artillery by its own commanders so as to get the best technical value out of the arm was not foreseen. For instance, C.R.A's of divisions were for a long time lieut.-colonels, then colonels, and those mostly temporary colonels, while the commander of the infantry of the division was a general, or at any rate, a full colonel. The Corps C.R.A. was usually only a colonel, which made it difficult for him to deal with generals commanding divisions. Finally the army artillery commanders were maj.-generals.

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General Herr considers the artillery commands should be as follows :—

A lieut.-general to command the R.G.A.
A lieut.-general to command army artillery.
A major-general the corps artillery.
A brig.-general the divisional artillery.
A brig.-general (or colonel) the brigade of artillery of the corps.

In addition a lieut.-general should represent the artillery at headquarters of army groups—finally the artillery representative at G.H.Q. should rank as an army commander. The latter would be the inspector general of artillery and his functions would be the same as those fulfilled by General Herr in 1918.

All these commanders should have suitable staffs.

Pages 258, 259.—Artillery air observation.

Born of the war air observation was at its best on the Somme in 1916, it deteriorated in 1917, and was practically no use in 1918. The reasons for this were, firstly constant changes of flights resulting in observers being unknown to battery commanders, secondly the lessening efficiency of artillery observers due to the fact that the best were attracted to the fighting squadrons, and finally indifferent aeroplanes.

Remedy.—Artillery observation service must be directly under artillery commanders.

This was so in the German army during the war and the artillery was never neglected in this respect.

The soundness of this was recognised in France—but flights didn't accompany the artillery regiments to which they were attached, when they moved.

Artillery should produce and train their own observers, and keep them by looking after their professional advancement. The Air Service would be responsible for the pilots and the aeroplanes and their administration, but for artillery flights, its rôle should be merely to tell off aeroplanes as aerial observation posts, or as quick means of getting about, just as the automobile service tells off a motor to a staff officer who wants one for a reconnaissance.

PART III.

Artillery in time of peace.

The headings in the index give a clear idea of what one reads in this part.

General Herr points out that it is quite impossible to manufacture new material for the system of artillery he advocates in Part II, Ch. 1, for financial reasons. Therefore the main point is to make up their minds what guns to keep out of the existing material and then to get on with the manufacture of.—

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(1) The infantry accompanying gun.
(2) A powerful long range Q.F. gun to supersede the 75.
(3) Q.F. field howitzer.
(4) Finally a gun suitable for anti-aircraft and anti-tank combat.

List of guns that should be retained in use subject to minor improvements being carried out :—

The 105 gun.
The 155 howitzer (1917).
The 155 G.P.F. gun with split trail carriage giving 60° traverse—subject to a more powerful tractor being provided.
The 194 G.P.F. gun.
The 220 howitzer.
The 220 gun.
Guns of A.L.G.P. ranging beyond 20 k.m.
Heavy howitzers of A.L.G.P.
Guns to have in reserve until replaced by new weapons :—
The 75 gun.
Anti-aircraft guns (75 and 105).
The 155L (patterns 1877/1914, 1917 and 1918).
280 howitzers.
All others to be scrapped.

PART IV.

Chapter I.—State of affairs in 1922.

Germany.

The army of 100,000 men comprises an abnormal number of senior officers. Selected officers from the services forbidden by the treaty of Versailles (aviation, heavy artillery, anti-aircraft defence) have been retained and temporarily attached to other arms; surplus officers are kept as N.C.O's; there are more N.C.O's in the army than privates. Great attention is being paid to the class of officer recruited and to improving the educational standard of officers.

Though it was intended by the treaty to suppress the General Staff and the War College (Kriegsakademie) there are still staff colleges in the defence areas which actually produce more trained staff officers in the year than ever came from the Kriegsakademie.

Regarding the artillery. Each division has a brigade of artillery comprising one regiment of three mixed groups.

A general is in command with a staff of 2 senior officers (one a general staff officer), 1 captain, 6 N.C.O's and 24 men. Each regiment and group is very well found in means of communication.

Each group has :—
1 battery 77 guns (range 10,700 m.).
1 ,, 105 howitzers (range 9,700 m.).
The third battery in each group varies in equipment.

In No. 1 group it has : —
4 infantry guns.

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In No. 3 group it has :—

4 anti-aircraft guns entitled guns to engage fleeting targets.

In No 2 group the third battery is an instructional organization for training observers, survey and meteorological sections.

Each group has its own ammunition column.

This organisation, embracing as it does, so many different kinds of weapon, forms an excellent nucleus from which to expand.

Regarding heavy artillery :—The Germans are allowed about 600 guns for fortresses and coast defence.

By keeping specimens of all modern heavy guns, and by keeping heavy artillery instructors in the field artillery regiments they hope to teach officers and men all about heavy artillery. The Germans, like everyone else, continue to study anti-aircraft, anti-tank, and accompanying guns in particular.

Finally the status of the artillery in the German army has been improved by the war.

France.

Sub-committees under the presidencies of artillery generals have produced separate reports on the following questions :—

Employment of artillery.
Organization.
Guns.
Ammunition.
Vehicles.
Construction.
Methods of fire.
Instruction.

From these a report was compiled by the president of the Central Artillery Committee, dated October, 1st, 1919.

The general conclusions arrived at in this report are as follows :—

"Whatever importance may be attributed to the study of former campaigns, it must be realised that the art of war is always in a state of evolution; the army must be in close touch with science and industrial life; the act of destruction, like that of construction cannot be developed without the knowledge of scientific and industrial methods, which are constantly changing."

Consequently the report lays stress on industries, scientific societies and departments giving their help to their country. Technical branches of the army should work in the closest co-operation with the High Command. The army has to be cut down in actual rank and file, but if an army of reduced effectives is a necessity, yet by attending to the above points, it may be hoped to put a very efficient army in to the field if France should again be forced to go to war.

General Herr (pp. 328-329) gives a few of the most important conclusions of the report as affecting artillery. These are some of them :—

In battle no one arm should be subordinated to another.

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The most important improvement in existing material is increase of range. Research should commence at once, for the improvement of propellants, projectiles, and guns to attain this.

* * * * * * * *

The gun of accompaniment should be carried on a light caterpillar tractor, armoured as far as possible. A calibre of 105 is sufficient for the heavy artillery belonging to the division—155 is suitable for corps heavy artillery.

* * * * * * * *

Artillery officers must not be allowed to specialise in any one branch, but on the contrary should do tours of duty with all natures of artillery.

* * * * * * * *

As with us the French training manuals have been revised since the war.

L'instruction provisoire sur le service en campagne de l'artillerie appeared in June, 1919, and in it are embodied the great principles of:—

Fire power;
Co-operation between arms;
Massed action and concentration of fire.

A scheme for training in fire tactics was put before all artillery officers, and tried at practice camps. Every regiment reported on it, and based on these reports a Firing Manual has been brought out laying down clearly and arbitrarily the methods to be adopted.

Manœuvre regulations for the various branches of the artillery will shortly appear.

The inspector general's department born of the war has been put on a permanent footing, and modelled on it inspector-generalships of infantry, cavalry, engineers, and aviation have been created.

The "*Centre d'Etudes d'artillerie*" where artillery doctrine is taught to artillerymen, officers of the General Staff, and other arms, has been retained, and its scope enlarged.

The instructional courses at the practice camp at Mailly now include all natures of artillery. In conjunction with these are courses for senior officers to teach them the command of *groupings* of artillery. (I use the word grouping as in France a group corresponds to our brigade.)

A certain number of artillery officers are trained each year in artillery staff duties.

Finally the question of industrial mobilization is in the hands of a committee of national defence which includes an inspection department for artillery construction.

PART V.

Chapter II is the concluding chapter of this admirable book.

In it General Herr adds a word of warning—as he truly says, the further the war recedes into the dim distance, the more inclined are

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we to forget the lessons we learnt from experience. People begin to question the advisability of lengthening ranges, etc.

They are apt to say that the lessons are all based on trench warfare and that therefore it is useless to keep huge masses of guns for the next war, which will commence as a war of movement to be succeeded, not by stabilisation, but by the defeat of the enemy. This, General Herr says, seems to be the argument most generally put forward. His reply to it is that the chief characteristic of modern war is the intense use of fire power. Therefore why reduce it. Artillery has to be left behind in moving war, they say. Then why not improve its range and mobility. The 6″ howitzer is too heavy for divisional artillery. Then construct (as the Americans, English and Germans do) 105 howitzers, etc. . . . . .

General Herr maintains that artillery is an antidote against most innovations.

Take gas.

Why was cloud gas abandoned? Because artillery was able to prevent the preparations for its emission, and so it became an artillery weapon. Aeroplanes begot anti-aircraft guns. Tanks begot anti-tank guns, and so forth.

Means of *transmission* and means of *transport* being necessities to mankind in peace time, are likely to improve out of all recognition and this will be all to the advantage of the artillery.

The day that wireless telephony is perfected will perhaps solve the question of artillery liaison with infantry, which after all is the most difficult problem in battle.

These are amongst the points made in this concluding chapter of a most comprehensive and instructive book.

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THE DEVELOPMENT OF MODERN WEAPONS.

A Lecture delivered at the Royal Artillery Institution, Tuesday, 13th November, 1923.

BY MAJOR-GENERAL SIR W. E. IRONSIDE, K.C.B., C.M.G., D.S.O.

Major-General Sir W. Gillman, K.C.M.G., C.B., D.S.O., in the Chair.

CHAIRMAN: Gentlemen, General Ironside requires no introduction from me. He has very kindly come here to-night to talk to us on "The Development of Modern Weapons," and situated as he is as Commandant of the Staff College, he is in an exceptional position to be able to talk to us about it.

I will now ask him to get on with his lecture. (Applause.)

MAJOR-GENERAL SIR W. E. IRONSIDE: Gentlemen, I am not going to give you a historical dissertation on weapons. I am only going to deal with three weapons. I want to apologise straightaway for not dealing with gas. Every soldier knows in his heart that the use of gas alters the application of all modern tactics, but restrictions have been put upon the use of gas by International Agreement. I will leave it at that. I am not touching upon gas and I disarm your criticism at once upon that point.

I am going to deal with three weapons only, and to discuss the simple uses to which they can be put in a modern army. I should like to say at once that, in all teaching it is necessary to understand that the men are brought forward by these modern weapons and machines, and that it is really the man who wins in the end. Never forget that. It is not the weapon but the man who wins the battle. You get numerous examples of that. You have the Russian Army in 1914 with good weapons, knowing how to dig the very best of trenches, and trained by men who had been through the 1904 campaign, and yet they could not withstand the German Army. I want to make a point of that. Whatever I say about these machines and weapons, I wish it to be understood that they make it possible for the actual men to get forward and that it may come to the courage of the men in hand-to-hand fighting to decide the issue of the battle.

I am going to deal with three weapons:—

Tanks.
Aircraft.
Transport.

These are the most important for the moment.

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Tanks.

With tanks I include armoured cars, because at present we have not got track vehicles everywhere. We have used armoured cars all over the world in places where one would hardly believe it possible to have used wheeled vehicles—such as Mesopotamia, North Persia and Russia. I think the tendency will be to have everything tracked sooner or later. So I include armoured cars for the present moment. Now here are weapons, tanks and armoured cars, which affect tactics. They seem to have had their greatest effect in small wars. I quote you the example of De Wet in South Africa. Those of you, who have enough service, know how we chased De Wet up and down South Africa and we chased him with horses and horsed vehicles. The same De Wet was captured just before the 1914 war inside six weeks by means of armoured cars. Some of the cars were not even armoured but were just cars manned with rifles. The vehicle beat the horse in countries where one would hardly have believed it, and proved itself superior because of its greater endurance over long distances.

The sending of big cars over rough country a few years ago one would have called impossible, but one now finds cars prospecting in the most remote districts of the Kalahari. In another case the Duke of Westminster in North Africa used cars with great success. You will remember a body of sailors marooned in the hands of the Senussi. These men were released by a sudden dash of armoured cars, moving at a pace impossible to other means of transport, and surprising the Arabs by their sudden appearance.

In Mesopotamia and Persia the same thing is happening. In my own experience I can tell you of examples up in North Persia where the armoured cars and cavalry worked together in the most wonderful way. Take a cavalry-man. He has to go over rough ground in which there is opposition. He moves up his armoured cars close behind him and advances under the covering fire from their machine guns. When he wishes to come back, often the most ticklish of all operations, he can do so under the overhead fire of his cars. He has something upon which he can fall back.

Again, armoured cars are of the greatest use in outposts. You put them upon a road, hidden from view, round the corner, so to speak. The picquets have a good supporting point towards their centre, upon which they can withdraw. An armoured car, come upon suddenly and unexpectedly by the enemy, will always be a difficult thing to tackle, and will stop an ugly rush. We used them like this in North Persia against the Bolsheviks with complete success. Often the cars were the last to withdraw. The picquets may even use them as a kind of ambush into which to draw the enemy.

One might even say that the mobility of cavalry is greatly increased by having armoured motor vehicles as an integral part of their higher units or under one command with them.

The armoured motor vehicle has revolutionized the question of Internal Defence.

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The greatest danger of old days in internal defence was that the fighting man was exposed to shooting from windows, houses and barricades. Now with the machine gun inside an armoured car practically the whole situation has altered. The Russian revolution, if you read stories of that, will show you what a Ford car with a Lewis gun in it can do in the streets. It stops any action almost at once. Street fighting is a thing practically of the past. It will be put down at once by these wheeled vehicles. A tank can hardly be stopped in a street at all. Even a barricade will have little effect on it. That means a great deal to us in places like India. The number of individual men that can be frittered away in a town for internal defence is enormous, and two or three fast moving tanks, kept in a central place as a sort of reserve, ready to be sent out at once to threatened points, allow of great economy of force. Your men can be maintained under cover, ready to occupy areas cleared by the operations of armoured vehicles. In fact, these vehicles make it possible for the men to occupy desired areas with as little loss as possible.

Now come to the late war. The bigger aspect of the matter. The thing that held us up in the war and created static warfare was wire. It is a curious thing that although we knew, from 1904 onwards, that wire was the thing that increased the power of the defence and every subaltern must have known that fact, because in his training he was always stopped in front of the wire, nobody ever told him how to get across it, no solution was arrived at. Gunners asked for ammunition and they were told that it was impossible to get enough ammunition to cut wire. People asked for machines to enable them to to push forward. The tank eventually solved this question. If you are making a defensive position, you are doing so with the definite idea of holding the enemy for a definite time, while you are preparing a blow somewhere else, or at a later date.

The erection of great wire fences certainly gave you this time. Now, it is very doubtful whether you will trouble to put up big wire defences, they can be pierced by tanks at any moment. I think that you will now only put up sufficient to stop the rush of cavalry and infantry. You can only hope for a very temporary respite. Here is a question of supply also. You will not in future demand the enormous quantities of barbed wire that were required in the late war. A saving in manufacture and man power at home and labour in the field.

Tanks and armoured cars are vulnerable weapons. Tyres and tracks can be blown up and the vehicle put out of action. In Mesopotamia the Arabs learned very quickly how to fire at tyres. The track is less vulnerable and their general introduction will be an advantage. Mud is the greatest enemy of these heavy weapons. I think one may say mud is the only thing that really stops a track vehicle—snow does not stop it. We used the tanks in Russia and they worked on the snow.

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Cooling inside the machine must be perfected. Even in ordinary weather it is hot inside a tank. At temperatures often found in Mesopotamia and India it is impossible to get men to work inside a closed armoured vehicle, and until cooling is much better than it is at present, the employment of such vehicles will be greatly restricted.

It is to its pace that an armoured vehicle looks for its immunity against an enemy armed with artillery. The Germans made great use of armoured cars in East Prussia in mobile warfare in 1914. Employed with cavalry, and infantry in motor vehicles, they proved a most efficient outpost protection. Where there is a net-work of roads, armoured cars show their great efficiency. They can give early information of any enemy advance and they necessitate the bringing up of artillery to deal with them. They offer fleeting targets and are difficult to hit, moving at well over 10-15 miles an hour. In hedge country they offer very little in the way of a target.

I have said that the armoured vehicle looks to its speed for immunity against artillery fire, and in big attacks, it also looks to its numbers. For tank attacks will consist of large bodies of tanks and not isolated vehicles. What are we to do to improve the defence against tank attack. Immobile defence by stringing out anti-tank guns along the defensive front is not the best means of defence. Tank must be met with tank. Defence must be mobile. Anti-tank guns strung out along a defensive front cannot be moved when once in position. Large quantities of ammunition must be dumped with these guns and dumped ammunition, if not used, is difficult to collect again, and the position of the immobile gun may not give it a chance to use the ammunition at all.

There will be tank fighting before a battle, just as there was cavalry fighting, until a certain superiority was obtained by one side or another. The defence will attempt to break up the attack before it gets to the main position. For a defensive battle you want a species of tank-destroyer, ready to move out to a threatened area and destroy attacking tanks.

Future tank attacks will come very quickly, and successes will develop very quickly. The problem in front of the attacker is how to bring up his infantry quickly enough behind the successful tanks, so as to take advantage of any break in the line, for the situation produced by the tanks may only be momentary. If the infantry is too far behind it will not be up in time.

If tank attacks come more quickly, there is all the greater need of counter-attack to prevent the improvement of the attacker's success. The defender must have forces ready to deal with the situation wherever it may come, and these forces must be thoroughly mobile, so that they may move to a threatened point. An immediate counter-attack is more than ever desirable.

Bad as it is, the immobile anti-tank gun in the defence may be necessary. It should be realised that, more than ever should the enemy's attack be shepherded into certain areas, either by physical obstacles or by mine areas, over which the attacking tanks will fear

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to go. Your immobile anti-tank guns cannot be unlimited in number, in fact they will be strictly limited. You could shepherd the enemy tank attacks towards points where they will come under sudden surprise fire at short range. It is at short range that the anti-tank gun looks for its greatest effect. To fire at tanks at long range will entail a very great expenditure of ammunition with little effect.

The battle of Cambrai gives a good example of sudden short range fire against tanks.

The heavy area shoot in defence is rendered difficult of application, owing to the pace at which tank attacks will develop.

There can be no doubt that the mobile defence is the most efficient. We must develop a mobile armoured gun as the antidote to tank attacks.

There is a point of especial importance which I wish to mention. That is the general vulnerablility of infantry units to tank attack. The radius of action of tanks is now so great that they may be expected far behind the forward fighting troops. Troops at rest will not be immune from tank attack. All units must be ready to assume an immediate defensive attitude against this form of attack. It is all the more important that infantry units should not be deprived of their guns of accompaniment, wherever they are. C.R.A's of Divisions must beware of taking away this weapon, even to strengthen some artillery action elsewhere. The gun of accompaniment is a gun of opportunity and of fleeting opportunity where tanks are concerned. If the infantry are deprived of this weapon, they will go back once more to demanding a gun of their own and so increase their already overloaded complement of weapons.

Before I leave the tanks I should like to say again that the tanks are there to get the infantry and cavalry forward to the points they wish to reach and they have not been called into existence to replace infantry and cavalry.

Aircraft.

It is not necessary for me to discuss the different species of aircraft. You all know them.

In dealing with this question of aircraft in war I wish to point out that in some quarters a new theory of war has been advanced. It has been advocated that aircraft can achieve the greatest success by concentrating upon the destruction of material and moral in the country with which they are fighting. This concentration is often advocated to the neglect of operations against the armed forces of the enemy.

The question is a deep one. Manufacture will only give you a certain number of aircraft and a certain number of bombs to launch from them. It is a question for the responsible authorities to say how this strictly limited supply can be best employed.

I should like to picture to you the position of a commander who has decided to concentrate against the material and civilian moral of his opponent. His own army will be less well equipped with aircraft than that of his opponent. The relentless advance of a superior army

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must have an effect upon his moral, and it will take a strong man to continue to see his army being steadily driven back. He will find that the enemy has prepared to minimise the effect of this intensive bombing. The Government will shift to some more secure place than the capital, the depots, arsenals and stores will be dispersed and protected by cover and anti-aircraft defence. If there is racial hatred between two opponents, this bombing may only increase the will to fight to the last, and should the intensive bombing not win the results predicted for it, the last stage of the Commander employing it will be a parlous one.

It would be against the principles of war to neglect action against material and civilian moral, but I believe that the main objective must remain, as heretofore, the armed forces of your opponent.

It must never be forgotten that just as there is a waning power of the offensive in operations on the ground, so there is also in air operations, perhaps even on a greater scale. Intensive operations in the air will lead to a great diminution in active aircraft available for operations.

Bombing from the Air.

Now as regards bombing from the air. Whatever number of planes and bombs you employ, I think it will not be possible to stop operations on the ground. If we take the picture of the Ypres salient, and remember the amount of shells that were poured upon our troops, we will realise that no air action will produce worse conditions. And yet the men went forward. Here again the question will be one of manufacture and transportation. It is for superior authority to say what proportion of these two services is to be given to air-bombs and to shells for artillery.

No war will commence with the amount of material we possessed at the end of 4 years of the late war. One must limit one's conception of the amounts that will be available. They are strictly limited.

Machine-gunning from the Air.

As regards machine-gunning from the air. This can only be effective against suitable targets. Such targets are bodies of troops at rest or moving up before deployment and in certain cases troops in disorder. Two cases of extremely favourable targets for bombing and machine-gunning from the air have occurred in the late war. The case of Rennenkampf's retreat in September 1914, and of the Austrians on the Italian front of 1918.

Reconnaissance.

Here I include aerial photography and personal reconnaissance. Commanders and staff officers will find the greatest use in viewing things from the air, just as they have done in the past from some convenient O.P. There must be aircraft available for this purpose.

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Command and Staff work.

One of the great points brought out by the war has been the value of personal liaison. If you are a commander in a responsible position and begin to feel down on your luck, there is nothing more cheering than the arrival of a superior to give you advice, relieve you of the responsibility of deciding doubtful points and raise your spirits. In small wars in such countries as Mesopotamia and Persia, the value of the aeroplane is very great in this direction. In Russia, using sea-planes on the rivers, it was possible to fly 200 miles, descend at points on the L of C to interview officers, to inspect the front line and return again, all in the time it would take one to visit a place a few miles away on a horse.

There must be aircraft available for this service.

Artillery.

It seems to me that it is very desirable that senior artillery officers should take the air. It is preposterous to place in the hands of a youthful observer the power to initiate the expenditure of large amounts of ammunition. A young observer can well report the results of a single shoot, but all larger operations should be controlled by a senior artillery officer. To quote an example of what I mean. It may occur that a counter attack is expected from a certain direction and a senior artillery officer should be detailed to watch this direction from the air, with the power to concentrate certain artillery units upon his own initiative against important targets. He will have a call in fact upon certain artillery units. This senior artillery officer would be in direct communication with the senior artillery officer on the ground in the area from which he will draw his concentration.

That brings me to the type of aircraft necessary for Commands, Staff and Artillery work. I think, just as they think in the Navy, that we must have a three-seater machine. The officer carrying out the work must be transported by the pilot and protected by a man with a machine-gun from other aircraft attacks. He must have his brain free to observe and report. If I go out as a general to reconnoitre, I take my means of getting about and I take an escort with me. I also take my means of communication with me. This should be so in the air.

A further theory has been advanced that armies on the ground are merely a means of pushing forward aerodromes for the bombing of the material and civil moral in rear of your opponent. Armies will at any rate have to fight to get forward, even if they are relegated to this ignominious rôle, and they must be properly equipped to carry out their operations. You come back once more to the proper equipment of the army on the ground.

Transport.

The introduction of fresh means of transport has revolutionized supply and has rendered the fighting troops more mobile. But in a

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great war, there has been rather an increase than a diminution of the number of non-fighting men employed to keep the armed forces in the field.

The employment of aircraft as a means of transportation presents an enticing picture. Troops and stores have been transported in aircraft and will be so transported in greater numbers each year. But the limited capacity of the aeroplane and the initial cost of the airship militate at the moment against their general employment in replacement of ground transport. Should large civilian systems of aerial transport come into existence, then they would undoubtedly be incorporated into the military means of transportation. One can eventually see fighting columns in small wars fed daily from the air, ignoring their clumsy lines of communication, and so reducing the number of men employed in non-fighting work. At present this picture is too futuristic to bother us.

The introduction of tank-tractors, armoured cars, lorries and motor-artillery has very much complicated the staff duties in connection with marches. They all move at different paces. March tables are difficult to make out. I will give you the example of a raid in which you decide to send armoured cars, cavalry, horse artillery and infantry in lorries. How is this force of different paced vehicles and animals to be brought at the same time to the desired point of action? How is motor-artillery to be marched on the same road with infantry?

In the 1918 advance in France my infantry brigade was fed by tractors. These tractors brought up food, water and ammunition to a given rendezvous over country impossible to ordinary vehicles. The effect was to give greater mobility to the brigade. The result appears to divide the transport into two categories. The 1st line of horsed transport, working with the actual troops and fighting close up with them, and the 2nd line mechanical vehicles working to the railways. Each unit will tend to decrease its fighting transport as the mechanical vehicles increase in mobility and range of action.

In a small war it is important to reduce the number of men employed in a theatre of war and the length of time the whole force is exposed to bad climatic conditions. You then reduce your number of potential hospital cases and indirectly the cost of the whole campaign, through pay and pensions for which you will become liable. An interesting exercise is to take a small war campaign such as the Egyptian campaign to relieve Gordon and to substitute modern means of transport. The results are sufficiently astonishing to be worth considering. In this campaign I calculate you could at least make a reduction of 50% of man-hours in the campaign, which would undoubtedly have been successful and not a failure.

Now, last of all, let me impress upon you gentlemen once more that it is the machine which makes it possible for the fighting man to get forward, and one must not think that the fighting man is being done away with by the advent of the machine.

(Loud and continued applause.)

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DISCUSSION.

CHAIRMAN: Would any officer like to add any remarks to this interesting lecture?

SIR NOEL BIRCH: I think, gentlemen, the first thing I should like to say is that we ought to feel proud that the lecturer is a Gunner. I have been to many lectures here, but do not think that any have interested me more.

Well, gentlemen, I am not for a moment going to say that the motor and the tank are not absolutely necessary in future wars, but I do not wish any gunner to go away with the idea that his job will not be more important in the next war than it was in the last. What we must go for is accurate shooting and a great deal of practice in counter battery work. At the beginning of the great war no one knew anything about counter battery work as we came to understand it later. With the help of the airmen it reached such a stage of perfection that by the 8th August, 1918, we completely mastered the German artillery. On many German batteries so accurate and heavy was our fire that the German gunners had no time even to move their muzzle covers. Tanks could therefore operate unhindered. Accuracy of fire we must always go in for and it is more important now than ever.

I remember in 1914 when the English cavalry corps was advancing in the direction of Ypres, the French cavalry, who were working alongside of us, happened to be in possession of four armoured cars. Those four cars were each dealt with, and in a very short time, by the German artillery and the moral effect on the French cavalry was very great.

Now I am in the fortunate or unfortunate position, whichever you may like to call it, of having the design of both the tank and the gun under me. You think of a gun to defeat the tank and then you think of a tank to defeat the gun and so the game proceeds. (Laughter.)

I do not think that the day of the land ironclad has arrived. You get into such appalling difficulties of weights and widths. How many bridges will stand a 70 ton tank? And, if a tank is to be moved by rail its width must be limited. In spite of the great mobility we are now getting in tanks, I do not think the gunner need despair of hitting them. The lecturer gave an example of missing tanks at Salisbury Plain, but if the worst comes to the worst we can always go for area shoots; not that I wish to encourage you in great expenditure of ammunition. I will give you one or two facts about ammunition expenditure in France which will make you ponder. In the 24 hours, 28th/29th September, 1918, 24,000 tons of ammunition were expended in one day, and in the whole war we shot away 4,400,000 tons.

Every gunner must go up into the air. It is absolutely necessary for all shooting, but more especially for counter battery work, and especially when counter battery work is to be done in a moving battle. Our counter battery work was most successful in the great advance in 1918 so, gentlemen, do remember that the gunner is still a most important person in battle. (Loud applause.)

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CHAIRMAN: Is there any Royal Air Force officer who would like to say anything?

CAPTAIN E. ASTLEY-RUSHTON, R.N.: May I ask two questions, sir—one with reference to the tank and the other with reference to the air? You, sir, pointed out the value of the tank in internal defence. The Navy is very often called upon to assist the Army, particularly in uncivilised countries, in the matter of internal defence. We used to run about with a 12-pounder field-gun; I am now wondering when you will ask us to carry a tank, and, if so, what size it is going to be? (Laughter.)

Another point you referred to was the difficulty of hitting a moving tank at 900 yards. I was just wondering whether that is possibly because the Army has not been accustomed—it has not hitherto been part of their problem—to tackle rapidly moving objects. The navy has done that for very many years, and the methods have been brought to a certain stage of perfection. Perhaps similar methods for land artillery may make it just as easy to knock out a tank at 900 yards as it appears to the naval officer to hit a rapidly moving ship at that distance.

With reference to the air. You pointed out that in the Ypres salient the troops were very heavily bombed from the air by artillery and that it had but little moral effect; those were disciplined men. You also quoted the Austrian rout on the Italian front and said the air had a great effect on the Austrians after their morale was broken; these men had lost their discipline, they were undisciplined. I wonder to what extent that factor of lack of discipline is going to affect the situation when it comes to the heavy bombing of a great centre of population. (Applause.)

CHAIRMAN: Anybody else?

MAJOR-GENERAL SIR W. E. IRONSIDE: In reply. We have had many a talk together on this subject—I should like to say of course that discipline is at the bottom of the question and that men get accustomed in an extraordinary way to this bombing, and when one went away for a week and then came back again one did not like it as much as one did before. You can get accustomed to it. People were not accustomed to raids in England and they really did not have any serious raids. They were not raids really—nothing to what they are going to be. People will get accustomed to it and must be disciplined, but I do not think a disciplined nation will give up on that account; the Government and people must be strengthened in their moral.

As regards hitting tanks. I am not much of a gunner and I have not served in the artillery since I was a subaltern. I think really the fact is that you have a very much more fixed mounting than we have and have so many instruments for measuring ranges. That makes the difficulty.

SIR NOEL BIRCH: The angle of sight.

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MAJOR-GENERAL SIR W. E. IRONSIDE: I am not going to make a *faux pas* amongst you gunners, nor to engage in a controversy, but there are all sorts of questions to consider. You are much more of a gunner than I am, I would only remind you that the country wobbles a great deal more than the sea does. (Loud applause.)

CHAIRMAN: Well, gentlemen, I have very little to say. I think about eighteen months ago Marshal Foch said when he was over here that there was no man living who knew what the composition of a Division would be on land in the next war, and I go away from this lecture feeling that I am as ignorant now as he was then. We are not allowed to talk about gas but we can think a lot like the parrot. What strikes me as having been brought out most forcibly in General Ironside's lecture is the interesting condition he depicts in the front line of the next battle and the changes likely to ensue owing to the increase of motor traction, both from the fighting point of view and in the question of supply and the diminution of troops on the lines of communication. On that last point I would like to give you one statistic, and that is that in Mesopotamia with five Divisions fighting—say 52,000 rifles—there was a ration strength of 450,000 men of whom many were on the lines of communication, and as General Ironside points out, if you cut down by 70 per cent. those on the lines of communication a great saving will be made.

There is one ray of hope that the Lecturer has brought out and that is that whatever my future prospects in the next world are, in this world if I do go to war again I may have a chance of flying! (Laughter.)

It only remains now for me to thank General Ironside very heartily for the most lucid and excellent lecture he has given us. (Loud and continued applause.)

MAJOR-GENERAL SIR W. E. IRONSIDE: Thank you very much indeed, gentlemen.

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ARTILLERY NOTES BASED ON THE WAR OFFICE STAFF EXERCISE AT NEWMARKET, OCTOBER, 1922.

(By an Artillery Officer.)

THE following notes are applicable to the circumstances which were presumed during the War Office Staff Exercise at Newmarket last year as described in the report. Both sides had quite small forces, both were fully equipped with every technical appliance that has been developed up to date except gas, and the organization in each case was that of our own army and of the Royal Air Force. It should be remembered that Royal Artillery Survey Units are provided in the proportion of one Company to a Corps of two or three divisions, or for the headquarters of a small "force." The notes do not touch on the use of artillery in defence except in so far as it affects artillery tactics in the attack; but it should be remarked that even if the opposing forces are equal in numbers, the attacking force, having the initiative, will normally be superior in guns on the front selected for the main attack.

Since they were written the War Office report on a more recent Staff Exercise in April, 1923, has been published, but its terms do not necessitate any modification in what follows, except that Pack Brigades are now part of the divisional artillery.

I. The Approach March.

(1) The opposing sides at the opening of hostilities were comparatively close together. The defender had to fight a delaying action and to avoid being pinned to the ground and destroyed by the superior numbers of the enemy.

(2) The attacking army could only hope to achieve its object by marching more or less deployed, and by disposing its reserves in such a way as to be easy to redistribute for a decisive attack when contact was gained and the enemy's flanks located.

(3) The correct solution of the problem for the attacking side was probably to move the two divisions parallel to each other over as wide a front as possible. Each division marching with two brigades in front on separate roads finding their own advanced guards, and with its reserve brigade on its inner flank so as to be centrally placed and in the hands of the Commander of the force.

The various units of Army troops including medium artillery and army brigades, Royal Field Artillery, would march at a suitable distance behind the centre and on as many roads as possible.

(4) The following points arise as regards the movement of artillery units during the "approach march."

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(a) The distribution of artillery when a division is marching with two brigades in front each on a separate road and finding its own advanced guard. There is a tendency to decentralise the command of artillery altogether to infantry brigade and even to battalion commanders. This is a wrong principle and the War Office report on the Exercise condemns it unequivocally. But it is not wrong to group artillery with an infantry brigade for a definite tactical purpose, provided that as soon as the task allotted to the group is fulfilled the C.R.A. resumes control of the detached artillery.

In the case described in para. 3 it is quite obvious that each of the leading brigades of a division must have artillery with it, some of which must be allotted to its advanced guard. As regard quantity, it is probable that in almost every case the brigade of artillery is the proper proportion of artillery to an infantry brigade. From an administrative as well as from a tactical point of view it is inadvisable to split up a brigade of artillery oftener than is absolutely necessary.

(b) The movement of Army Brigades, Royal Field Artillery, Pack and Medium Brigades, Royal Garrison Artillery, and the D.A.C. The principal point is that the movement of all these units must appear on a march table issued by the General Staff of the formation responsible for their movement.

The advent of tanks and motor transport has made the march of a mixed force a much more complicated business than was formerly the case and only the General Staff of higher formations can issue the orders necessary to ensure that there shall be no clash. It is not enough to say that the "C.R.A. (or G.O.C. R.A.) will issue orders for the movement of the Corps (or Army) Artillery." As far as the actual movement is concerned it has to be remembered that all the natures of artillery mentioned above move at different paces, and that medium brigades are at present partly horse drawn and partly drawn by F.W.D. lorries whose economic speed is rather fast (7 or 8 miles an hour). "B" echelon of the D.A.C. will also be entirely M.T. in future.

(c) If full use is to be made of the R.A. Survey Company, its commander and most of his survey personnel, as opposed to sound ranging and flash spotting sections, must be well forward. Some of them would probably be with the advance guards of each brigade, so as to be able to begin their work as early as possible. (See Appendix.) It is also desirable that the survey sections should be reinforced by men from the sound ranging and flash spotting sections who have had survey training, when they can be spared from their proper functions.

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II. Preliminary operations.

(1) During the Staff Exercise it was assumed that contact was gained on a wide front at about mid-day and that by 3 p.m. sufficient information was available to enable the commander of the attacking force to decide to make a frontal attack as early as possible the following morning, and to determine the front on which he would make it. He also decided to support the attack with all the guns of the division on whose front it was to take place, reinforced by one brigade Royal Field Artillery of the other division and all the Army Artillery. The total amount of artillery supporting the main attack in this particular case was 5 brigades, Royal Field Artillery, one Pack Brigade, Royal Garrison Artillery and one Medium Brigade, Royal Garrison Artillery.

(2) It is obvious that to select positions for so much artillery, to get it into action and to allot its tasks during one afternoon and night is a matter of some difficulty, and unless the work is carefully organized delays will result which may well upset the whole operation.

It will not be possible to wait for written orders to be got out. The Artillery Commander at the headquarters of the force and the C.R.A. of the division must give their orders verbally.

(3) The situation would be somewhat as follows. The advance guard brigade of each division would be deployed and in contact with the enemy, and some or all of the field batteries supporting them would be in action with liaison officers and artillery patrols well forward. The reports of the advance guards combined with such personal reconnaissance as he had had time to make would form the basis of the Commander's decision as to the time and place for his main attack. Details of the enemy's position would not be known except locally by the leading battalions and by the artillery shooting over them, both arms reconnoitring in the closest co-operation. This point is of considerable importance. The survey personnel with each advance guard would have begun to fix the positions of important localities.

(4) It may be assumed that when he makes up his mind the Commander of the force with his C.R.A. (and C.R.G.A. if there is one) will be well forward. In order to save time in the issue of preliminary orders the Divisional Commander (or Commanders) on whose front the decisive attack is to be made should also be close at hand.

(5) The preliminary artillery orders and instructions should be issued, verbally if necessary, in the following sequence by the C.R.A. Corps (or Force) and the the C.R.A. Division respectively :—

(a) By the C.R.A. at H.Q. of the Force (or Corps).

(i) Orders to the Brigade Commanders of Army or other reinforcing artillery, who may be at a considerable distance, to come forward and select positions. It is highly important that Force H.Q. should always know where all its artillery is located even when on the move.

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(ii) The allotment of artillery to the division or divisions which are to make the main attack. This involves a decision as to whether any artillery will be retained under the orders of the C.R.A. (or G.O.C. R.A.) of the Corps (or Force). This would certainly be the case (a) if there were more than one medium brigade, (b) if the attack was to be made on parts of the front of two divisions, or (c) if any batteries were to be retained exclusively for counter-battery work.

(iii) Orders as to the front of attack, the general area of gun positions, and the reconnaissance of positions for any artillery which is to be retained under the command of the C.R.A. of the force.

(iv) Orders to the O.C. R.A. Survey Company as to the fixing of bearing pickets and points in the enemy's position. As stated in Section (I), para. 3 (c), and (II) (3), details as to the line held by the enemy, which are all important in deciding the line on which fire is to be opened, will only be known to the leading troops. It will always be necessary for some survey personnel to march with the advance guard, to keep in constant touch with the situation and to be always prepared when halted to fix their positions and take the necessary steps to produce the topographical information needed by the artillery. (See also Section II, para. 3 and Appendix.)

(v) Instructions as to the resection of positions, and as to registration or predicted fire as the case may be.

(vi) A rough limit as to the amount of ammunition which may be expended in support of the attack.

(vii) Instructions as to time-table or other arrangements for the support of the attack.

(b) By the C.R.A. of the division on whose front the main attack is to be made.

(i) The allotment of zones to the Field and Pack Artillery brigades which are to cover the attack of the division.

(ii) The allotment of areas for the occupation of positions by the divisional artillery and by reinforcing brigades. It is suggested that as the Officers Commanding Brigades of the divisional artillery would probably be close at hand they should be ordered to select positions for the reinforcing field and pack batteries as well as for their own. When medium batteries are brought up from a distance and when there is no C.R.G.A. the preliminary reconnaissance of their positions to cover the main attack would have to be done under arrangements made by the C.R.A. at Force Headquarters.

(iii) General orders as to the expenditure of ammunition, resection of positions and the use of predicted fire, registration, and the support of the attack by time-table or otherwise.

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III. The Organization of Command and issue of Orders.

(1) The command of artillery when small forces are involved presents certain difficulties.

(2) As long as possible the normal system should be adhered to. This system may be defined as follows :—

(a) The Field and Pack Artillery covering the attack of a division are under the command of the C.R.A. of the division.

(b) When there is a C.R.G.A., Medium Artillery should remain under his command if only for administrative reasons, but the programme of medium guns allotted to bombardment should be arranged in consultation with the General Officer Commanding the division which is to make the attack, and should conform to the latter's wishes. This relationship between the Division and the medium artillery was known during the war as "affiliation."

(c) Counter battery arrangements, co-operation with the Royal Air Force, A. A. Defence and ammunition supply from railhead to D.A.C. are the duty of the Staff of the Force or Corps.

(3) In the case of a small force of two or three divisions it is probable that the decisive attack would often be made on the front of one division only, and it is desirable that in such a case all troops taking part in the attack should be under the command of the General Officer Commanding the Division. The C.R.A of the attacking division should undoubtedly command all the Field and Pack Artillery which are acting in support of it.

As regards medium artillery, if more than one brigade is present, there will presumably be a C.R.G.A. at the headquarters of the Force (or Corps) and the general control of the medium artillery should remain in his hands. It is his duty to co-ordinate the work of the medium (and heavy) artillery but as stated above he should consult the wishes of the Divisional Commander in regard to the allotment of bombardment tasks. (See 2 (a) above.)

If there is only one Medium brigade available which is to be used exclusively on the front of the decisive attack, it appears inevitable that it should be temporarily placed for tactical purposes under the C.R.A. of the division that is to make the attack.

(4) Thus a situation may arise in which the C.R.A. is called upon to command as many as six or seven units. On the last day of the Newmarket staff exercise the C.R.A. of the division which made the decisive attack was in command of five brigades R.F.A., one medium brigade R.G.A. and one pack brigade R.G.A. The conclusion reached during the war was that five units was about as many as one commander could deal with effectively.

(5) This problem of command cannot be satisfactorily solved by indiscriminate "sub-grouping." One reason for discouraging the too frequent formation of the so-called "infantry brigade group" is that the Infantry Brigade Staff is designed to command four battalions and

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nothing more. It is equally wrong to ask an artillery brigade commander who has only an adjutant and an orderly officer to help him, to command two or three brigades of artillery.

It is however justifiable to group two brigades together on the understanding that the headquarters are at the same place or at any rate within 100 yards or so of each other. The senior Lieutenant-Colonel of the two receives orders from the C.R.A., and settles with the other Lieutenant-Colonel as to the division of the appointed task between the two brigades. Both then issue orders separately to their respective batteries. This arrangement will relieve the C.R.A. from the issue of unnecessarily numerous and detailed orders. What must be avoided is the withdrawal of an Artillery Brigade Commander and his staff, which includes the Brigade Signal sub-section, from his brigade in order to command a group, and the substitution in his place of one of his Battery Commanders with an acting adjutant and an improvised signal staff. If this is done in moving warfare confusion and difficulties of every kind must ensue, because the whole of the normal chain of command and communication is dislocated; nor indeed were such improvisations satisfactory in static warfare, though often adopted.

The batteries of Pack Artillery brigades will often be distributed over a wide front and it is doubtful whether their brigade commander will always be able to exercise direct control over all of them. If he cannot do so it will probably be best to put each detached battery under the command of the nearest Field Artillery brigade commander.

Recent rulings in regard to the employment of pack artillery for anti-tank purposes have made the question of its command a matter of urgent importance particularly as regards the supply of ammunition.

After the attack has reached the limits of the time programme the artillery command must for the time be decentralized to some extent and the action will be fought out by groups of all arms acting on their own initiative within the scope of the Commander's plans. In administrative matters however and particularly ammunition supply the Force (or Corps) Staff must retain control. The normal system would be to attach a field artillery brigade and a pack battery to each of the leading infantry brigades, but to retain the rest of the divisional artillery in mobile reserve. In large operations all or part of a medium brigade should be put under command of the G.O.C. of each division. The command of Army brigades and other reinforcing field and medium artillery should be resumed by the officers concerned. It is improbable that further decentralization such as the placing of a battery under the Lieut.-Colonel commanding a battalion would ever be necessary. Artillery and infantry should be able to work in close co-operation without such formalities, which usually tend to a "parochial" use of the guns.

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IV. Selection of Positions and advance into action.

(1) In "moving warfare" guns need not be so far forward as is the case when a "set piece" attack is made on an organized position. For ammunition reasons alone there can be no question of a prolonged "creeping barrage" supporting the attack far into the enemy's defences. At the same time a proportion of guns of all types should be far enough forward to be able to fire at distant objectives in answer to calls from the air, which to a limited extent will be possible even without large scale maps. As in defence, the batteries of a brigade are best disposed in depth. Batteries which are to move first should be in places which they can get out of quickly. In this connection it may be remarked that there is a tendency to put pack batteries too close up at the start. It should be remembered that the 3·7″ howitzers have a considerable range and that they will be the first to advance. As a general rule the exigencies of communication are a dominating factor in the selection of positions for batteries within a division. For this reason the advantages of oblique or enfilade fire are often neutralised by difficulties of control and supply.

(2) Orders for the advance into action must be issued by the General Staff as in the case of the approach march.

A concentration of artillery during the course of one night behind a small portion of the front will necessarily involve a good deal of lateral movement which must be co-ordinated with that of tanks, infantry and M.T. columns. It is unlikely that the Division in whose area the concentration is taking place could deal with the movement of a number of reinforcing units from other formations, and the movement orders will have to be issued from above. No backward movement from batteries to wagon lines (except by teams) or from wagon lines to D.A.C. should as a rule be allowed until all troops are in position. Such restrictions would of course emanate from the Division.

V. Resection of Positions, Predicted Fire, Registration.

(1) There can be no doubt whatever that everything possible should be done to reduce "registration" to the smallest possible limits when an attack is in preparation.

The attached appendix is taken from the report of a reconnaissance made just before the Staff Exercise by the Commandant School of Artillery and the Chief Instructor in Survey, and was based on a situation which was produced on the ground during the preparatory working out of the exercise by the Directorate of Military Training.

It may be remarked that the ground in question was very much enclosed and no existing triangulation points were visible. Further to the West, on the ground which was reconnoitred with a view to attack on the last day of the actual exercise, the fixing of gun positions and of points in the enemy's lines would have been a far simpler matter.

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(2) In the Appendix it is claimed that given certain conditions and assuming that the O.C. R.A. Survey Company and some of his personnel are kept well to the front during the approach march, enough information can be given to batteries within a few hours to enable them to open fire on a good many targets without registration. It is important that artillery should try and work to this, even if the necessary data can be given only to some of the batteries.

Registration gives away the positions of batteries to hostile aeroplanes, and is very difficult to organise in such a way as to avoid confusion. Moreover it has to be done by daylight and may cause the hour of attack to be postponed.

The question of whether or not predicted shooting is possible will often be a deciding factor in fixing "zero" hour.

VI. The Organization of Artillery Support in the Attack.

(1) The form which artillery support should take in moving warfare when guns are few, ammunition limited and the details of the enemy's organization for defence not well known, is a very difficult problem indeed. Moreover the presence of tanks has introduced a new element in regard to which there is no very definite experience.

(2) (a) It is held by some that if the tanks reach their objective on a wide front their action will be decisive. Those who hold this opinion argue that we must use our artillery in such a way as to ensure that the tanks can get on, and that the advance of the infantry is a secondary matter. This support it is claimed can best be given by means of a smoke screen.

(b) Assuming that this is the case we have to consider what action the enemy can take to stop the movement of the tanks, apart from land mines or other obstacles natural or artificial.

(c) We may find that the enemy's infantry are provided with anti-tank weapons of some sort. We shall also have to deal with the enemy's guns and with counter-attacks made by his tanks.

(3) (a) Of the above means of defence the hostile artillery is perhaps the least dangerous. It will usually be weaker than that of the attacking force, and such guns as are used expressly for anti-tank work will usually be in the open. As this statement is highly controversial it may be of use to make a short digression on the organization of artillery for defence against tanks, a subject which bristles with difficulties. Ground observation and the quick passage of orders are essential. Fire cannot be observed if other guns are firing in the neighbourhood, hence the zones of responsibility must be carefully defined.

The tank attack is usually made by sections (of 4 tanks), each section being on a battalion front and the remainder of the company being in support or (infantry) brigade reserve. A section normally moves in diamond formation on a front of from 200 to 300 yards. To engage such a target with

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2 guns would be difficult, to use any more would surely lead to confusion. In such circumstances how many of the attacking tanks would be hit over ground which was normally undulating? Would it be safe to concentrate all artillery fire against the attacking tanks, and if not, how many guns could be spared by the defenders for anti-tank work alone?

(b) The enemy's anti-tank artillery can be dealt with by batteries whose fire is "super-imposed" in the bombardment so that it can be withdrawn in case of such emergencies.

These batteries must be in positions where control is easy and their O.P's must be the best available.

(c) Counter-attacks by the defending tanks are not likely in the earlier stages of the attack, and will normally be dealt with by the attacking tanks. It does not seem advisable to post any guns with the special role of dealing with tank counter-attacks at the *outset of an attack*. But the "close support" artillery which advances with the infantry must be prepared to deal with tank counter-attacks later.

(4) In opposition to the argument advanced in para. 2 (a) it is maintained that although our tanks may break the enemy's line in many places it is only infantry that can seize and hold the enemy's position, that the tanks will not necessarily have disposed of all the enemy's means of defence against our own infantry, and that the supporting artillery must deal with them.

(5) While admitting the importance of protecting the tank attack it is clear that the defenders' heavy and light machine guns and the anti-tank weapons of his infantry, if he has them, must be taken into consideration. These will be the principal targets of the attacking artillery; but the defender's guns must not be neglected.

(6) In determining the organization of the covering artillery fire, we have to decide :—

(a) When fire is to be opened and how long it is to remain on its first objectives, in other words, is there to be a "preliminary" bombardment.

(b) What these objectives should be.

(c) How fire is to be subsequently applied, i.e., whether it is to "creep" back, or to go back by "lifts" of some hundreds of yards at stated intervals and be redistributed on a series of more distant objectives.

(d) What the rate of fire is to be, and the duration of each "lift."

(e) What nature of ammunition should be used.

(7) (a) In moving warfare the governing factor in the answers to all these questions is the amount of ammunition available. There is perhaps a tendency to overstate the need for economy in ammunition in the "moving battle." It is quite true that there can be no question of long barrage programmes lasting for two or three hours, but it is equally important to realize that we must be prepared to expend the ammunition necessary to carry the infantry and tanks through the

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enemy's resistance. To stint ammunition at the beginning of an attack may be fatal, as we learnt by bitter experience in France in 1915. If the enemy's position has been so far penetrated that the artillery are able to make a general advance it is probable that one line of wagons will supply a battery with all the ammunition needed for some hours afterwards, as his defences are unlikely to have great depth.

(8) (a) With regard to the time of opening fire (see sub. 6 (a)) it is of course assumed that the enemy has not had time to construct strong obstacles and otherwise organise his position. Given that fire is predicted or registration complete, the shorter the interval between the opening of covering fire and the forward movement of the infantry the better. But if the attack is made by daylight, and the forming up positions of the leading tanks are some distance behind those of the infantry, which might often be the case in open country, it may be necessary to put down a smoke bombardment of some minutes to conceal their movement forward to the infantry starting line.

(9) (a) The choice of objectives on which to open fire, the distribution of fire as between immediate support of the attack and counter-battery work, and the organization of covering fire by artillery during the attack (see sub. paras. 6 (ii), (iii), (iv) and (v)) are to a great extent interdependent. Besides ammunition supply, and the nature of the country there are other considerations which must be taken into account and among them the following :—

(i) The width of front over which the attack is to be carried out.

(ii) The total number of guns available.

(iii) The information that has been obtained as to the dispositions of the enemy's infantry and artillery and the character of his defences. For this the advance guards will be mainly responsible. (See Section II, para. 3.)

(iv) The importance of simplifying the tasks of subordinate artillery commanders who have little time for determining their ranges and lines of fire or for working out time programmes.

(b) It may be laid down without any risk of contradiction that fire in immediate support of the attack, as opposed to counter battery fire, must be sufficiently intense to enable the infantry and tanks to get to their objectives. It is no use silencing the enemy's artillery if our infantry and tanks are pinned to the ground by other fire from the enemy's defences. Every possible gun should at the outset be used to help the infantry and tanks forward, and guns should not be withdrawn in order to fire on hostile artillery unless the latter is known to be *preventing the forward movement of the attack.*

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Therefore the original plan of attack should as far as possible be based on the number of guns available to support it. If the total front to be attacked is too wide to allow of a continuous belt of fire of adequate density, then it is better to make separate attacks on separate localities with sufficient artillery fire to cover each attack and to prevent mutual support by the localities in question. The intervening spaces would not be engaged. Such attacks would normally be simultaneous but in some cases, where the localities are not capable of mutual support or when there is a shortage of guns it may be possible and indeed necessary to attack one locality some time later than another, the same guns covering both attacks. This was contemplated in the final stage of the Staff Exercise. It is an operation that would require careful organization. If simultaneous or consecutive local attacks are not possible the only alternative may be to abandon all idea of a frontal attack.

(c) Some batteries should be detailed in advance for counter-battery work, should necessity arise. In the circumstances under discussion exact information as to the location of the enemy's batteries cannot be expected and it will therefore be difficult if not impossible to deal with them by means of unobserved fire. Hence we shall not be able readily to "neutralize" them as was the case during "trench to trench" attacks in the late war. Conversely the enemy's artillery which will normally be weaker in numbers and equally handicapped in regard to unobserved fire is far less likely to interfere with the progress of the attack than in trench warfare. It must be remembered also that fire with ground observation on which the defender would have to rely is absolutely dependent on effective communications which are difficult to establish and even harder to maintain. Aeroplane co-operation will often be handicapped by the absence or inaccuracy of large scale maps. After artillery has been in action for 48 hours in the same position (which is well within the possibilities of "moving" warfare when large forces are involved) sufficient information as to the position of hostile artillery will probably have been accumulated to make organized counter-battery work feasible and indeed necessary. (See Section VIII, (f).)

(10) (a) Covering fire may be subsequently applied in one of two ways.

(i) By means of the so-called "creeping barrage."

(ii) By bombarding known or probable positions of the enemy until our troops have reached them, and then "lifting" to positions further back.

(b) The second alternative depends on a knowledge of the enemy's dispositions almost impossible of attainment; and even if it were certain that every point at which we fire is actually

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occupied there will nearly always be other points (some of which may be invisible) equally dangerous to our own troops. This was proved only too often in 1915 on ground that had been studied by observers for weeks. Moreover, unless the individual points which are engaged can be accurately located by co-ordinates there is no certainty or even probability that all our fire will be effective; for when observation is difficult the most careful registration may lead to an error of 50 yards in the mean point of impact, with the result of failure to quell enemy's fire.

The real object of artillery covering fire is to keep the enemy's heads down as the attacking troops are approaching his position, and this is as well done by the arrival of a "creeping barrage" as by a bombardment of half an hour which will have no great killing effect, even if the range has been accurately found. The dust of a barrage especially if mixed with smoke will protect the advance of both infantry and tanks from aimed fire.

(c) Another practical advantage of the "barrage" is that although accurate maps may not be available the Survey Company should be able in a comparatively short time to provide the artillery of a Division with sufficient information to enable them to open fire on a *definite straight line* drawn on a trace through two or three points whose co-ordinates are known. But it would be impossible in the same time to select and fix the positions of a number of points which it was desired to bombard. In the circumstances which arose during the Newmarket Exercise it would have been impossible to open unobserved fire except on the "barrage" principle or to register without postponing the hour of attack. It may be said that a bombardment lifting from one line to another much farther back would almost invariably necessitate ranging or "registration," the disadvantage of which has been referred to above.

(d) It seems therefore that in every respect except perhaps ammunition, the barrage is preferable; but, as will be seen from para. 11, the depth of an unprepared defensive position would not entail a very heavy expenditure. Nor is it clear that an effective "bombardment" (as defined in 10 (a) (ii)) would be much less expensive.

It is of course most important that the line on which fire is *opened* should be on *our* side of all points occupied by the enemy. Only the forward troops possess the information necessary to fix this line.

(e) It is of equal importance to ensure that possible flanking positions for the enemy's machine-guns which are not included in the objective are engaged or blinded. It may therefore be necessary to combine the bombardment of points on the flanks with the "creeping barrage." It is

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seldom if ever advisable to weaken the barrage by bombarding points in rear of the enemy's line which may be occupied by machine guns firing frontally at long ranges. If the machine guns are there at all they are hard to find, and if their position is not accurately located no harm will come to them. In any case their fire will be hampered by the smoke and dust of the barrage.

(11) (a) In Section VI, sub-para. 5, the rate of fire is referred to as a matter for consideration. As stated in para 6 it is affected by ammunition supply, but here again undue economy may lead to the failure of the attack. The smaller the proportion of field guns to frontage the greater the rate should be. The rate of fire of heavier natures should be proportionate to the weight and effect of their shell and to their resources in ammunition.

(b) The "pace" of the barrage, i.e. the number of minutes during which the gun fires at each successive range is intimately connected with ammunition supply and rate of fire, but it is still more dependent on the rate at which the attacking troops whether infantry or tanks will cover the ground. It is presumed that tanks will preserve much the same pace as infantry when their lateral movements are taken into account.

In trench warfare in France the pace of the barrage on what was *then* considered good going was 100 yards every 3 to 4 minutes. Assuming that in good going and without the numerous obstacles of a trench system infantry will cover 200 yards in five minutes, 18-pdrs. firing at an average rate of $2\frac{1}{2}$ rounds per minute, a reasonable rate of fire for a normal proportion of guns, could support an attack to a depth of 1600 yards (and an unprepared defensive position will not often be deeper) during a period of 40 minutes, with an expenditure of 100 rounds of ammunition, i.e. the contents of the gun limber plus one complete ammunition wagon.

(12) (a) As regards ammunition it is not intended to enter into the old controversy as to the respective merits of shrapnel and H.E. Each should be used in due proportion and in accordance with the character of the target. It is undoubtedly advantageous to use H.E. in a "predicted" barrage or bombardment when the height of the objectives cannot be exactly determined as is often the case. The use of smoke shell however raises a most important question, in regard to which there is a sharp conflict of opinion. See Section VI, para. 2 (a).

There is a school of thought, which maintains that artillery ought to carry a very high proportion of smoke shell in order to screen the forward movement of our own tanks, and that a smoke screen combined with effective counter-battery work is all that is necessary. It is an extreme view and like most extreme views is perhaps narrow.

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(b) The subject must be looked at in the light of tactics as they affect all arms, including tanks. (See Section VI, para. 2.) In the first place is there not a danger that a dense cloud of smoke may lead to loss of direction which is never very easy for a tank to keep? Assuming that smoke is the best form of artillery fire to cover a tank attack, is it true that the attainment of their objective by the attacking tanks will necessarily put an end to all resistance on the enemy's part? May not his infantry still be able to stop the advance of our own infantry without whom the captured position cannot be held?

The writer has no wish to dogmatise, for with tanks and anti-tank weapons in their present state of evolution the answers to these questions are not easy to make.

(c) As at present designed the expenditure of 18-pdr. ammunition necessary to maintain an effective screen for more than a few minutes even in favourable weather is almost prohibitive. The 4·5 How. shell is a good deal better, but far fewer guns are available.

The vagaries of wind currents, particularly in hilly country make it very hard to place the M.P.I. correctly. How difficult this is may not always be appreciated.

The solution may be found in smoke produced by the tanks themselves.

It seems to the writer, however that the desire for smoke protection, like the constant increases in the weight of armour in the 14th and 15th centuries, may in the end defeat its own object.

VII. Co-operation with Aircraft and Anti-Aircraft Defence.

(1) The postponement of the consideration of aircraft co-operation with artillery is not due to an underestimate of its importance. It comes into every stage of offensive operations from the approach march onwards, and for this reason it is best considered separately.

(2) Aircraft will be used to observe for artillery covering the movement of an advance guard and experiments are now being carried out with a travelling wireless set.

It will be the constant duty of the artillery airman to locate, report, and photograph the positions of hostile guns, and of bodies of troops whose size and position seem to him to be of tactical importance. The technical value of observation of fire by aircraft for artillery is generally recognised though much remains to be learnt as regards its technique both by gunners and airmen. The tactical aspects of the question however are sometimes overlooked.

(3) In moving warfare when ammunition is scarce the enemy's guns should not be engaged unless there is a definite tactical object in so doing nor unless a definite "shelling connection" is established between the shell and the gun that fired it. In other words it is no use shooting at them unless they have been identified as doing actual

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harm to our own troops, or have been conclusively proved to be potentially harmful. For instance it would be justifiable to engage positions known to hold hostile guns in order to prevent them from opening fire at our own troops when the latter are on the point of passing through an unavoidable defile.

(4) In trench warfare both sides have accurate maps and artillery communications are good. Targets of "military importance" are thick on the ground and unobserved artillery fire is often effective, even if only by "aiming at a pigeon and hitting a crow." Moreover when a trench to trench attack is in progress the attacking artillery is compelled as a matter of course to neutralize the enemy's guns which may otherwise break up the attack. In moving warfare as stated in Section VI, para. 10 (c), the conditions are different. Neither our own nor the enemy's guns will be able to bring accurate predicted fire to bear at short notice on any objective within their arcs of fire. Similar difficulties are attendant on answering calls from the air.

It will therefore be necessary during an attack in open warfare to restrict the liberty of batteries in this respect. A battery will almost always have to be ranged by the airman, whatever its target, and blind concentrations however favourable the objective will seldom be effective when the aeroplane can only indicate it by means of the protractor or the "Verey Light." Unless fire is effective ammunition is wasted, and in "moving warfare" may be irreplaceable.

Moreover as already stated we cannot in open warfare afford the ammunition to fire at hostile troops, of whatever arm, unless the expenditure is justified by the tactical situation.

(5) From first to last the governing factor is tactics, and it is difficult to over-emphasize the importance both to the airman and the gunner of the power to make a correct estimate of the tactical importance of an objective before shooting at it. Even in "static" conditions thousands of shell were wasted.

(6) It is of course difficult to determine the exact moment when warfare ceases to be "open" and becomes "static," and there are various intermediate stages. The larger the opposing forces the slower and less frequent their movement will be, But though two large armies may face each other for days or weeks on some portion of their respective fronts, movement will go on elsewhere and the total stabilization which occurred on the Western Front in the late war is not likely to happen again. As far as artillery is concerned however, and particularly counter-battery work, a delay of two or three days in the face of the enemy should enable the full machinery of the counter-battery staff (sound-ranging, flash-spotting, aircraft co-operation and so on), to be brought into play with a view to locating and mastering the enemy's guns. Conversely the enemy's artillery organization will be similarly improved.

(7) Throughout operations the artillery staff must always bear in mind the importance of this work for it can never be foreseen whether movement forward or backward will continue or whether the front will stabilize partially and locally. It will be its duty to arrange

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that there is no delay in establishing the counter-battery "machinery" of the higher artillery command as soon as it is required, and to ensure that our own guns secure the initiative without which those of the enemy will not be overcome. While movement is still frequent and only divisional control is possible, the divisional artillery staff is responsible for collecting information about the hostile artillery with a view to counter-battery action, and the process should never cease as long as the opposing forces are in contact. But as soon as the survey units which are corps troops can be brought into play counter-battery control should automatically pass to the corps, and the previous work of the divisional artillery will then be of the greatest value.

(8) In all cases an activity report by an airman is always required before finally determining that a position is occupied. The co-operation of aircraft with divisonal artillery before corps control is established must be arranged through the corps artillery and counter-battery staff officers whose principal function will be the collection and dissemination of information, both to assist the divisions in locating hostile artillery and with a view to the eventual assumption of counter-battery control by the corps. The corps must co-ordinate the use of the squadron's machines by divisional artillery.

(9) Though not always possible the best defence against aircraft is concealment, and the necessity of protecting wagon lines and gun positions from view should always be borne in mind.

The organization of A.A. defence by anti-aircraft guns and searchlights is the function of the General Staff and need not be alluded to here. As a general rule during movement the principle of an advance or retirement by bounds when one body of troops covers the movement of another is applicable to the advance or retirement of anti-aircraft artillery. Local defence with Lewis and Hotchkiss guns is the duty of the unit and of the highest importance.

VIII. Conclusion.

In conclusion it will be useful to recapitulate those points in connection with artillery tactics in the attack as applied to the operations of a small force against a highly trained enemy, which seem to call for most consideration.

They may be summarized as follows :—

(a) The rapid issue of preliminary orders and instructions for the concentration of artillery in order to support an attack against a limited portion of the enemy's front.

(b) The best method of reconnoitring positions for reinforcing artillery which has to come from a distance.

(c) The importance of predicted fire from surveyed positions and the necessity of obtaining the maximum of information required to enable covering fire to be opened without previous "registration," and of handling survey personnel so that this information arrives in time.

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(d) The organization of artillery command when field, medium and pack artillery are concentrated in considerable numbers on the front of a division.

(e) The organization of fire in support of an attack led by tanks particularly in respect to the choice of objectives and the use of smoke; and with due regard to economy of ammunition and the perils of weak artillery support.

(f) Co-operation with aircraft in country where accurate large scale maps are not obtainable and in particular the study of the tactical aspects of co-operation as opposed to the mere technicalities of observation.

APPENDIX.[1]

1. From the survey point of view, the problem is as difficult as it could well be, because of the enclosed nature of the country and the few hours of daylight available. At the same time, it is a perfectly feasible proposition provided that very careful arrangements have been made beforehand and that the personnel (both of the Survey Company and of the Artillery brigades) has been sufficiently trained and practised in survey methods.

2. For this particular problem, as affecting the 2nd Division, it has been assumed :—

(i) That a complete R.A. survey company at war strength and with the transport allowed by the proposed War Establishment forms part of the Corps.

(ii) That a party from the R.A. Survey Company (say 2 officers and 10 other ranks) is attached to each Division from the start and is at least as far forward as the leading Battery Commanders. As soon as the infantry show signs of being held up, these parties commence a survey reconnaissance on their own Division front as a matter of routine.

(iii) That the O.C. Survey Company is well forward and is in close touch with the C.R.A's of both Divisions, and that the Company is marching in a central position and close to his hand. The personnel of the flash-spotting and sound-ranging sections will not be required for their normal work and will be available to reinforce the survey section.

(iv) That the topographical section of the Field Survey Company (R.E.) at war strength, and with two box cars as transport, is carrying forward the triangulation concurrently with the advance.

(v) That the survey personnel of brigades have been trained to fix their own positions and lay out lines of fire based on the work of the survey company, after dark with the aid of lamps.

[1] *Note.* The references are to O.S. ½ inch to a mile Sheet 25. The position of the division of our own troops which was to make the attack was approximately from the T of CHEVINGTON to CHEDBURGH Church. The enemy were occupying posts on the slopes on the opposite side of the stream.

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(vi) That the leading infantry arrived on the line of the river from the T in CHEVINGTON to CHEDBURGH CHURCH about 13.30 hours, and that some Battery Commanders and some Survey officers were near RUFFINS HOUSE and REDE HALL at the same time.

(vii) That the Brigade and Battery Commanders of the reinforcing brigades are sent up in advance of their commands and arrive in their battery positions by 16.00 hours.

3. The nature of the country is such that *resection* as a general *modus operandi* and would be quite out of the question. All work would have to be done by *traverse* and the O.C. R.A. Survey Company, by using his flash-spotting and sound-ranging personnel if they could be spared, would have additional men available for this purpose. In the forward portion of the work it would probably be advisable to duplicate the parties to allow for eventualities.

The grid system should be that adopted throughout the theatre of operations and Field Survey Units will be responsible for giving in terms of this grid system the co-ordinates of the points from which traverses start and close. Under the special conditions of this exercise other trig. points such as the monument in Ickworth Park and Chedburgh Church would also be fixed.

4. The time taken to do the work will depend largely on the skill of the personnel and the way in which it is organized by the O.C. R.A. Survey Company, so as to subdivide and distribute the work to individuals and to co-ordinate their efforts. An operation of this sort would require a good deal of training and practice, particularly in surveying at night. Work at night would be perfectly feasible near the battery positions which would presumably be hidden from the enemy's line. In more open country where resection is possible, the survey operations would be a good deal easier and would not require such elaborate organization.

5. The general plan of the work for the R.A. Survey Company is as follows :—

(i) Stations are distributed along the front to locate points in the enemy's line.

(ii) At the same time another party runs a traverse from a definite point in our own lines to connect up these stations.

(iii) A third party is detailed to run a traverse from this same point through the general line of the battery positions, and to join up with the first traverse.

(iv) The observations are worked out and a list of co-ordinates is issued to batteries.

(v) Batteries fix their positions and lay out a zero line of fire from the battery area traverse.

(vi) An artillery trace is compiled in the C.R.A's office showing the two traverses, points in the enemy's position, the starting line of the barrage, and the allotment of lanes to brigades.

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6. It would probably be advisable to fill in three or four parallel barrage lines on the trace and mark them A, B, C, D, etc. Batteries would then prepare to start on A line but could be ordered to start on B, C or D if the situation had altered during the night. The only provision which should be insisted on is that the line is fairly straight and is continuous along the whole division front; the danger of men straying off their own front and being caught by the advancing barrage of the unit in their flank, is too great to allow of variations in the starting line to suit individual units. Under the circumstances, absolute accuracy of the opening barrage cannot be guaranteed, and the infantry should form up at least 300 yards behind the proposed artillery starting line, ample time on this line being given to allow the furthest units to get close to the barrage before it lifts.

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LIAISON BETWEEN INFANTRY AND ARTILLERY

Being some notes on an article from the "Revue d'Infantrerie" for September, 1923, written by Colonel Jèze.

By CAPTAIN D. J. R. RICHARDS, D.S.O., M.C., R.G.A.

THE writer entitles his article "La Liaison par le bas," and gives as his reason for confining himself to this aspect of a broad question that he considers liaison between divisional and regimental commanders and the artillery commanders whose duty it is to work with them is sufficiently ensured by the juxtaposition of their respective headquarters. The regulations are explicit on this point, and also on the necessity of an exchange of views taking place at least daily between the infantry commander and the O.C. his supporting artillery. But though liaison between lower formations is theoretically perfect, and functions impeccably in indoor tactical exercises, the open air seems to disagree with either instruments or operators, and even in peaceful exercises on the ground communications break down. The importance alike of artillery support and of maintaining touch with the gunners would hardly seem to want proof to-day: but a case is quoted of a battalion of Chasseurs à pied which was suddenly stopped by a burst of rifle and machine-gun fire coming from the edge of a wood. The battalion lost 600 casualties in a few minutes and was held up for $2\frac{1}{4}$ hours, yet when communication was established, 60 rounds from a $75^{m/m}$ gun enabled the unit to brush aside without trouble the resistance which had hitherto been insurmountable.

From the example given the paramount necessity of rapid communication between the infantry unit and the guns is evident: but how is it to be attained? The writer dismisses the telephone in three lines as having proved itself impracticable for use in front of Brigade Headquarters. With optical signalling devices he has experimented more fully, especially with a view to eliminating what he considers the chief defect of Lucas type projectors, the invisibility of the signal flash when the sun's rays strike the reflector—either directly or at certain angles of incidence. This he proposes to effect by providing the reflectors with a dark background: but he decides against optical signalling on another ground, that of the difficulty of finding a practicable post for the operators. No mention is made of flag-signalling, and although vaguely referred to in the regulations, I have never seen it employed in the French army, nor have other officers attached to infantry and cavalry schools. Evidently it is not considered worth while devoting to it the proportion of time necessary to ensure good results.

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Col. Jèze thinks that to rely to a greater extent on light signals would be a mistake. Bad weather may render them useless and the enemy with a little ingenious interference may easily manage to muddle the receiver of the message.

At present French infantry battalions are not equipped with wireless, and the author considers this sound, as the operators would have to work under conditions so difficult that it would be impossible to rely on results being obtained. (Without commenting on this statement it may be remarked that the échelon "regiment" has charge of most of the infantry "battle accessories," the battalion being as much as possible relieved of "encumbrances.")

The French call the power buzzer "T.P.S." (télégraphie par le sol), and the possibilities of T.P.S. are examined at some length, though the conclusion come to is somewhat influenced by the author's statement that "the artillery have no T.P.S." from which premise he concludes that the message would have to filter through at least three headquarters. As T.P.S. is shortly to be issued at least to "groupes" (brigades) if not to batteries, the reasoning is somewhat falsified. But Col. Jèze objects to T.P.S. also on the technical ground that a road or rocky terrain intervening between the sending and receiving instruments renders their efficacy doubtful. He concludes against supplying the artillery with T.P.S., as it already possesses wireless which can better supply its needs for other purposes.

Runners are qualified as being the slowest but surest means of communication. As they usually take about two hours to get a message through to the artillery they must be regarded as a last resource.

Pigeons exist in insufficient numbers, and must therefore be reserved for missions even more important than communication with the artillery: and dogs are ruled out as no results have ever been obtained from them.

Colonel Jèze accordingly concludes that some other means must be found of establishing liaison: and he picks upon the aeroplane to supply the deficiency. He regards some of the other methods as capable of amelioration, such as T.P.S. and optical signalling: but increasing the power of the former and the dimensions of the latter would probably render them too cumbrous for infantry purposes. The aeroplane is, however, already employed to transmit certain infantry requirements, such as :—

(1) Request for a barrage.
(2) Request for preparation.
(3) Request to lengthen shooting when infantry wish to advance.

The typical situation to be tackled is as follows :—a battalion in the first line attacks and is held up by heavy fire from some centre of resistance in the enemy's lines. The battalion commander, having tried to overcome this resistance with the means at his disposal and failed, realises that unless losses are to become excessive he must obtain artillery support. How is this to be done? The method suggested is the following :—

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(1) The first-line elements that are held up at a point "A" make a pre-arranged signal to the contact aeroplane.

(2) The aeroplane observes the signal, locates "A" by its co-ordinates, and transmits signal and co-ordinates to the artillery.

(3) The artillery opens fire at a constant distance in front of "A." The distance suggested is 400 yards.

(4) The infantry observes the shooting and makes signals indicating "left" or "right," "over" or "short."

(5) The aeroplane transmits the signals until the battery is considered as ranged: the shoot for effect then commences.

(6) When the infantry considers the preparation sufficient, it signals to the aeroplane to order "cease firing" and advances again.

How are these signals to be transmitted? If battalion headquarters is concerned a set of ground strips and panels is available, and the demand can be made by a recognised code: but a company only has the "panneaux de jalonnement" (one per two men) normally used to indicate their position to the aeroplane. Col Jèze proposes that the unit held up shall display a line of these panels, and that this signal shall indicate :—

(1) I am held up.

(2) This is my position.

(3) I request artillery preparation in my front.

The second transmitting operation is easily effected by the wireless apparatus of the aeroplane.

In the third phase the artillery opens fire on a point 400 yards in front of the unit held up. This distance of 400 yards is made up as follows :—

Safety margin	200 yards.
Allowance for faulty location by plane	100 yards.
Allowance for mistakes in ranging	100 yards.

If it is the battalion commander that sends the signal, he must add the distance that his troops are in front of his headquarters. If battalion headquarters and the company in the line both make the signal, the aeroplane transmits that of the company first. It has been suggested that the infantry should give the co-ordinates of the point "A," but the aeroplane observer would be in a far better position to do this than the company commander, who would very likely be crouching in a shell hole.

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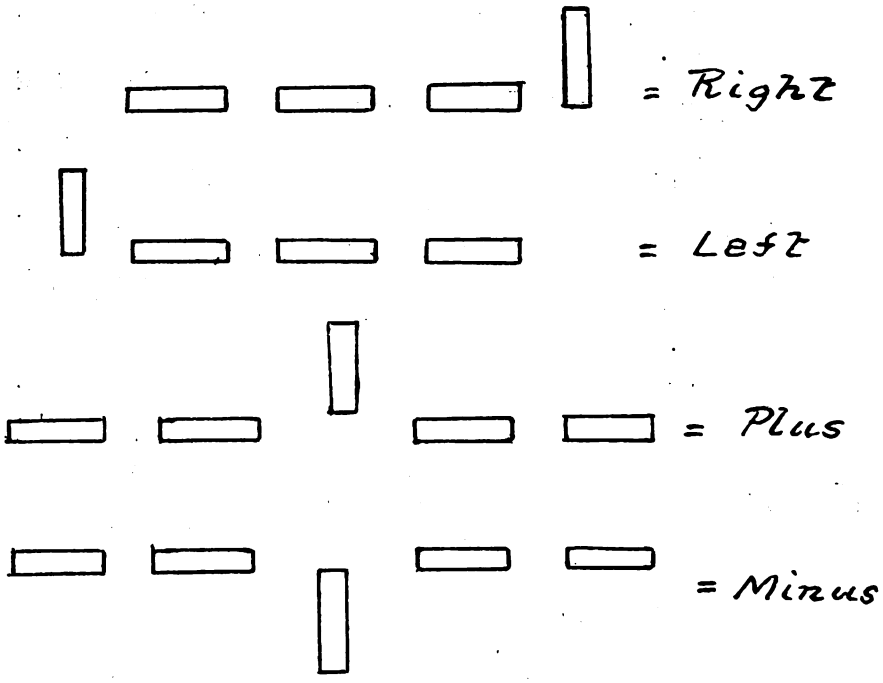
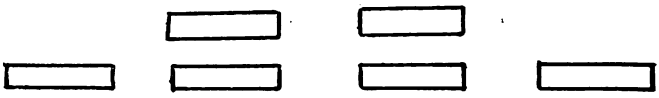
The fourth step, in which the infantry ranges the artillery by indicating to it + or −, L or R, seems the crucial one. Col. Jèze proposes to do this by a trifling re-arrangement of the panels, thus :—



while the battery would be informed that it was correctly ranged by the signal—



The interpretation and transmission of these signals by the aeroplane presents no difficulty.

When the infantry decide to advance, they make with their panels the signal—

H = halte au feu.

Such a procedure seems also applicable to the case of a battalion which is unable to keep up with its barrage : as not infrequently occurs. If the infantry fails to follow up the barrage, it does not do so from pure light-heartedness, but because it is incapable of doing otherwise. In such circumstances the barrage ought to be adjusted to suit the infantry, but the gunner never knows when to do this, so the infantryman must tell him. The same method as before indicated can be employed. To stop the barrage the infantry can put out the signal H.

To bring it back the signal for "shots falling plus," and to start it again the signal for "shots falling minus."

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The aeroplane, in sending the message, would indicate the position of the infantry.

Colonel Jèze sums up as follows :—

(1) Liaison between fighting units of infantry and artillery is of primordial importance. With it, success: without it, a bloody disaster.

(2) The regulation methods at the present time do not solve the problem satisfactorily: any of them may break down, and all of them are slow.

(3) The combined employment of aeroplane and panels solves the difficulty.

(4) It is not advisable to defer the adoption of a solution on the pretext that a better one may be found.

It is very difficult to comment on an article of this type without indulging in futile destructive criticism. The statements and the suggestions put forward confirm an impression that wireless and T.P.S. have not functioned well in recent trials, notably at Coëtquidan last year and in the autumn manœuvres this year. But it seems that insufficient training has probably been responsible for the failures, rather than any real defect in the means of transmission themselves. And the tremendous number of persons now interested in wireless problems is a guarantee that improvements will be made in the near future in the capabilities of the instruments, and that a supply of operators will in future be available. For a short service conscript army time is not available in which to turn an unskilled man into a specialist. Every advantage must therefore be taken of the qualifications a man already possesses; and the vogue of wireless cannot but be useful. Col. Jèze's proposal is open to two objections: it seems to demand a high standard of combined training from the infantry, and it assumes that the aeroplane can always see. With the conditions that exist in the French army, the training of the men (not always the same ones) make the signals seem rather difficult; the situation presupposes that effective supervision is impossible, and a wrong signal might have unpleasant consequences. The system seems more applicable to a professional army like our own. I wonder what the Regiment will have to say to the proposal to "monkey" with the barrage. Unless some convention were arranged beforehand, after a short time the barrage from above might appear like a succession of isolated bonfires perambulating without cohesion or aim over the countryside. Nevertheless there appears much food for thought in the article; and one point which it brings unwittingly out into relief is the great reliance the "poilu" places on the gun behind him.

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A.A. GUN PRACTICE.

BY MAJOR T. C. NEWTON, D.S.O., O.B.E., R.F.A.

EVER since the war, when the Germans obligingly flew for us, the problem of finding an A.A. target has presented very great difficulties. All the obvious expedients such as balloons, smoke bursts and the like suffer from overwhelming drawbacks. They have no independent movement and rely entirely on the wind; they do not resemble the real thing in either appearance or movement; they are unrealistic to the last degree. The next possibility is the glider launched from an aeroplane in mid-air. This again, however, is not a natural target. It descends at too steep an angle, and in addition is very difficult to handle, very expensive, and liable to be lost in the sea on descent

Many other expedients have been tried abroad, among them the following:—

Targets towed behind an aeroplane—for technical reasons a target suitable only for quite elementary practice.

Throw-off fire—requires special apparatus for observing and sighting and is excessively unrealistic.

Use of false heights—gives very restricted movement and falsifies the relative speed of target.

After all this catalogue of failures let us examine the single exception which promises well.

It was suggested that a reduced charge giving the shell a ceiling of 8,000 or 9,000 feet might be used in conjunction with a target aeroplane flying well above this height. In addition to altering the charge it was also necessary to modify the fuze composition in such a way as to give bursts on the line of sight with similar times of burning to those of normal fuzes fired with full charges. That is to say, at corresponding fuze settings and angles of sight both full and reduced charge ammunition give bursts on the same line of sight but at quite different heights, one bursting at the true height of the target and the other at some lesser height below 8,000 feet. The only alteration required on the gun and predicting instruments is re-graduation of the tangent elevation dial and of the Brocq time-rheostat dial.

By this means fire can take place with reduced charges at any aeroplane flying above the ceiling of the gun without making any change in the normal procedure. The time of flight is practically the same as the true time of flight and all the usual difficulties of picking up and following the target are reproduced. In everything except height a full scale A.A. shoot is carried out at an aeroplane target.

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As regards judging the effectiveness or otherwise of the fire, errors in line can be observed from the gun but not errors in height. To check the latter it is necessary to observe the heights of the shell bursts and compare them with the corresponding height of the target. Further, owing to parallax, it is necessary to observe the fire for line from a position very close to the guns. This method of fire suffers also from the disadvantage that there is no target which can actually be hit, and the full inconvenience of the noise and recoil of full charge ammunition is not experienced by the detachments. It is necessary for them to fire in addition some full charge ammunition to learn how their gun behaves in action.

Against these disadvantages many advantages are gained not given by any other method yet evolved. Fire is at an actual aeroplane flying at normal heights and unrestricted as to course or speed. We need only consider the safety limits of the range, and the range itself can be considerably shorter than with full charges. The airman who obligingly serves as target is not endangered in any way. He is safe but bored. The laying and instrumental work is normal throughout and, more important still, the times of flight are the true times for the target in question. They are not reduced or minimised in any way and the most important factor in A.A. fire thus retains its full power. Wear of guns, usually a serious matter with the comparatively high rate of fire of A.A. equipments, becomes reduced to a fraction of the normal figure.

There seems no doubt that reduced charge ammunition for A.A. practice has come to stay. It is not the ideal solution of the problem, but it has many important advantages.

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SHOOTING AT TANKS FROM COVERED POSITIONS.

By MAJOR A. D. MACPHERSON, D.S.O., M.C., R.F.A.

THE title of the article in the July number is disarmingly modest.

At the risk of being labelled a "bow and arrow gunner," or an optimist, I venture to put forward my own ideas on the problem of "Hitting Tanks from covered positions."

The difficulties to be met by batteries armed with the latest pattern 18-pdrs. with their big traverse, steady mountings, independent line of sight, and fixed ammunition, are comparatively small. The 4·5″ howitzer B.C. is faced with a harder task. There appears to be no hope of re-armament owing to the existence of so large a stock of 4·5″ howitzers so that we have to make the best of what we have got. F.S.R. II. 0135 para. 8* says "When tanks precede or are in close support of the hostile infantry, every gun which can effectively do so, should engage the tanks," so we must not be out of the hunt. B.C's must be trained to engage moving targets with bursts of fire, making forecasts of the tank's movements and avoiding small deflections at short ranges. Battery drill must be quickened up, accuracy being sacrificed to speed.

"Gun ranges" should be ordered provided the guns shoot reasonably alike; fourth charge even at ranges below 2000, and in flat country angle of sight constant – zero.

Experiments have been carried out during the summer with Nos. I responsible for switches, making use of the fact that a movement of the spade by its own breadth gives a switch to the gun of 16 degrees. (On the 4·5″ the shield interferes with the knuckles method.) The results have been disappointing and the writer has gone back to the dial sight, the number 3 using the V sight on the crosshead combined with a clicker fitted to the micrometer head to facilitate quick adjustments. Tanks at short ranges are very difficult to compete with; but extra gadgets at the O.P. are only a source of confusion. It is better to rely on quick brains and quick drill. The great essential is that the guns should be shooting and that shells should be arriving in large numbers.

"There's mair room for missing than hitting" as an old keeper remarked when the writer was "shooting at" high birds with conspicuous lack of success.

Unless one gives oneself a chance, with plenty of shell one is never going to hit anything. Single rounds are useless. "Sometimes they flies into it"—but not unless the sportsman is using a "scatter gun."

* Amendments issued with A.O. for December, 1922.

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CAPTINS AND LOOTINANTS

BY CAPTAIN JOSEPH C. HAW, C.A.C.

Reprinted from "The Coast Artillery Journal," August, 1923.

"CHARLIE MOLBRIDGE! I ain't seen him since Moses was a mess-sergeant. Is he still in the Islands?"

"He is *not*. He was dismissed th' Service right afther New Years, poor devil."

"Ye say Charlie Molbridge was dismissed th' Service?" Old "Snap" Larrigan exclaimed.

"Yep. He went all to pieces, what with likker an' the tropics," replied the other, a slightly younger man with a first sergeant's chevron upon his sleeve. "Just went to hell."

" 'Tis a pity—no, 'tis a dirty, stinkin' shame. Oi was top cutter in th' ould five-wan-three coompany whin he jined, an' a foine bright lad he was. Four years in Piddlin' Pete's outfit done for him, Bucky."

"Whaddaya know about that? I never thought Piddlin' Pete had spunk enough to lead a man to drink."

"Ye're right—he did not. But he niver give th' lad no responsibility—no reg'lar stiddy job he could take a pride in doin' well—an' it desthroyed th' boy's inthrist in his work. Him bein' bright an' high-spirited, natch'ally he tuk to dhrink. Yis, 'twas the makin's of a foine officer was sphoiled be piddlin'."

"Ain't I had that kind meself? I got busted a-purpose after six months of "Pottering Paul" Monson, and when Lootinant Jameson got his orders for the Canal Zone, I heard him say to Lootinant Cook 'Thank God, Cook,' he sez, 'I'll get out of this devilish company. I don't mind any kind of work,' he sez, 'but I hope my next captin will give me some responsibility, some definite job. I've bin in the Service five years now, and the only stiddy work this captin ever give me was to balance the company fund book at the end of the month—an' he only done that because he messes it up every time he does it himself,' he sez. Oh, but he was bitter!"

"Now ye have opened up a subjick upon which I have thought much," said old Larrigan. "Th' ways of a maid wid a man are strange, but not near so quare as th' ways of a captin wid his lootinants. Sure, I ought to know, too. Over thirty years was I in th' Service, half of ut a top cutter, an' in France a lootinant an' captin.

"Yis, captins an' lootinants I can read like books—'tis not so hard either, Bucky, me bhoy. An' I've marvelled at 'em; for years have I marvelled.

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"Ye see, Bucky," and now the stubby pipe stem was pointed at the second button of "Buck Lennon's blouse as the old soldier warmed to his topic, "ye will admit thot th' captin has a grand opporchunity to mould his lootinants—to 'assert his leadership,' the regulations calls it. There ain't no associashun so close as that bechune th' captin an' his lootinants. Furthermore, most gin'ally they comes from th' same class av peepul, have th' same kind of eddication, an' th' same future befoore thim. An' th' captin has bin a Lootinant himself, too. Thin besides, the lootinant is younger, and shorter in th' service, an' he is aizy impressed an' aizy led. Whin he jines up, he is ready to accept the captin as a hayro. For all this raisons, 'tis aizy for th' coomp'ny commandher to assert his leadership.

"But does th' captin see this? Does he do anythin' about ut? No! many toimes he is aslape at th' switch. What is th' raisult? Why, bein' a bright, well-eddicated young lad, it does not take th' lootinant long to size up his suparior. His brain, though not so machoor, is equal to th' captin's—sometoimes betther. Th' captin cannot bluff him. Th' min know th' captin well; th' top kick knows him betther nor his own wife do; but th' brave young lad knows him betther thin he knows himself. Ain't it thrue, Bucky?"

"You bet. Even in technical matters which ain't yet well understood by the boy, the captain can't bluff him, because a keen young feller don't have to be acquainted with no arithmetic to find out whether a man really knows what he is talkin' about."

"An' answer me this, Bucky: how many captins have yez served wit' that was hayroes to th' lootinants, eh?"

"Mighty few; mighty few, sarge. And them as was, they was real, all-around he-men, *believe me.*"

"*Oui, oui.* There's many a good man sphoiled in his early years av service. For mind ye, if a man is av suparior ability, he will overcome th' handicap av a poor thrainin'; he will thrain himself; yit he misses much. But th' others! Th' average man who gets off to a bad start may niver overcome it. Av coorse, 'tis but few will go to th' dogs, aven tho' wimmin an' gamblin be not yet extink. Th' most av them will suffer chiefly in their effeeciency. They will be piddlers, p'haps; or wantin in th' all-roun' mil'tary knowledge an officer shud have; or aven—an' this is th' worst—lackin' in th' fundimintal qualities of a sojer."

"Well now, sarge, just what do you call a 'bad start'?"

"Why, be thot I mane th' condition thot raysults whin th' captin fails to do his juty be his lootinants. There are foive principal juties, Bucky, thot he owes to thim."

"First, ye will grant that afther all th' lootinant will not be a lootinant all av his service. Therefore he must prepare himsilf for th' future. Now there is much in war thot can be learned in toime av peace only be study. So th' coomp'ny commandher must encourage th' boy to consither th' problims au war as prisinted in books be thim thot ondersthands th' business of sojerin'."

"But who expec's a youngster to study?"

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"Ay, 'tis thrue thot they prefer other amusemints,, in th' natur' av things. But they has some toime whin there is naught else to do, so why shud they not use it to improve their intellecks? Moreover, a mon must have a hobby. Why shud not th' study av his professhun be his hobby? Ye know how they do run to gadgets an' slipsticks for th' plottin' room in their early days. Howiver, too often they do not study th' ways av troops thot do move about frum place to place, an' for why? Because nobody iver dhraws their attintion to th' fac' thot war is movemint. Faith, an' how are they to know thot widout somebody tellin' thim? So I sez, 'tis up to th' captin to insphire thim wid an inthrist in th' broader things av th' professhun av arms.

"Thin, av coorse, it goes widout sayin thot they shud be rotated from job to job in th' outfit until they have hild thim all. Have I not knowed lootinants who was niver range officers? An' others thot had niver superintinded th' clainin' av recoil cylinders? An' some thot cud not make out a final statemint? An' agin others thot had niver run th' coompany mess? How kin th'loikes av thim command a coompany?

"Thin there is th' study of leadhership. Th' thrue leadher is born, but they are few; forchunately however, th' av'rage officer kin be diviloped into a fair leadher. 'Tis not a subjick thot has set rules; but if a mon's attintion be atthracted to th' matter, he can learn much be observashun an' thought. In toime av p'ace, in th' reg'lar army, any raisonable mon kin git along some sort av way, becuz he has th' power av' th' gov'mint at his back, he is but rarely thrown upon his own resources intoirely, an' he has experienced non-coms to hilp him. In time of war 'tis diffrint intoirely. Th' officer is advanced to a grade whose juties he has prob'bly niver performed; he has siv'ral toimes as many min undher him as iver befoor—an' all av thim green as grass, both officers an' min. It takes real leadhership to turn thot mob into a dischiplined organization, an' lead ut in battle.

"Yes, 'tis nicissary to study th' ways av min, to learn how to size thim up an' how to insphire their actions. An' th' captin can do much be kapin' this always befoor th' lootinant's mind, an' discussin' wit' him th' cases thot arise, showin' th' lad th' rasons for his decisions.

"Now, Bucky, I have coom to a thing av th' first importance. Can ye guess it?"

"Well, sarge, you have mentioned nothin' of making a soldier of the young man."

"Ye have hit it square! Th' most important thing for him to learn, av coorse, is th' fundamintals av bein' a good sojer. No matther what th' lootinant has larned pravious to receivin' his commission, a lack av judgmint be th' coompany commandher may foriver ruin him from bein' a thrue sojer. I have seen ut. What lad could iver be loyal afther listinen' daily to his coompany commandher knockin' ivery ordher thot coom down, an' ivery suparior he iver heard uv? Who could larne th' thrue manin' av th' word *juty* if th' captin was late to half th' formations, or wint on sick report because he had bin on a bit of a party th' night before? Who could take a

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pride in his outfit if its commandher was always talkin' about what a poor bunch av min he had undher him? Who will strive to be neat an' snappy if th' Ould Man is sloppy an' slouchy?

"I tell ye now mon, thot in ivirythin' 'tis th' example of th' captin thot counts tin toimes as much as his words, but in th' line av sojerin it counts a thousand toimes as much. An' th' worst kind av captin is th' mon that's always knockin'.

"There's no doubt about ut at all that th' captin's first juty is to tache rale sojerin. A damn fool can't be a good sojer, but barrin' damn fools, in toime av war I would rather serve undher a stupid man thot had absorbed th' principles av dischipline thin under a bright mon thot was undischiplined. So sojerin is th' fourth thing; but there is yet one more, th' fifth juty av th' coompany commandher.

"This is not somethin' thot th' lootinant must be taught, but 'its somethin' thot is nicissary for his welfare. Ut is thot th' lootinant must be give satisfaction in his work. Anybody kin see thot unless he gits some satisfaction out av his work, he will take no inthrist in ut, an' be th' same token ut will therefore be impossible to tache him any av th' four things he must learn.

"Now ut is only proper thot th' lootinant shud do th' dirty work aroun' th' coompany, th' piddlin odds an' ends. But if this is all, he soon hates th' thought av his job, an' shirks if he can.

"Th' solution, Bucky, lies in wan word—responsibility. He must be give responsibility. Thin he is not only liable to catch the devil if he goes wrong, but on th' other hand he is entitled to credit if he does well, an' he can therefore take a pride in his work an' feel th' satisfaction av successful accomplishmint. An' in no other way but be givin' his responsibility can he be afforded a chanct for satisfaction in his daily life."

"Ut is in th' coorse av educatin' thim in th' various details av work around th' batthrey an' th' coompany thot responsibility may be land upon thim. There is a point here about which th' captin must be careful. Practically ivery reg'lar job is held be a non-com, excipt only those av range and implacemint officer an' platoon commandher. These min had rather do their own work than have th' lootinant interferin' wid thim. If th' lootinant be lazy, or th' captin had not showed thot he wishes th' lad to take ful responsibility, th' non-com will still do all th' rale work an' th' lootinant will actually exercise but little responsibility. Therefore th' coompany commandher must personally see to ut that while th' lootinant is first learnin', he shud as near as possible perform all th' functions av th' office, such as mess sergeant or gun commandher. Afther th' lad knows th' game, thin he should exercise a more gin'ral supervision."

"Yes—afther the lad knows the game. It seems to me, Sarge, that all this applies only to shavetails. How about them as have served some years?"

"Me argumints are equally thrue, Bucky. Th' captin still has th' same five juties to perform; for remimber this, me lad, no man can iver learn all there is to be know about any wan of the four things a lootinant should be taught, let alone the four of thim together. If th' lootinant has had some service, thin 'tis for th' captin to discover

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in what respecks his trainin' has been deficient, and to correct those th' first av all; an' thin to continue his eddication on all lines. Th' captin is forced be his position to assert his leadhership; besides, he is still th' senior in length av service, an' usually in years. Therefore he shud have no difficulty in th' matther.

"As for th' fifth juty av th' coompany commandher, no matter how ould th' lootinant may be, 'tis still th' captin's place to give him responsibility an' satisfaction in his work. In fac', 'tis probable thot th' older and more experienced a mon is, th' harder it is to foind responsibility thot will satisfy him, for he is liable to want a bigger job than th' coompany affords to a lootinant."

For a time there was silence, while the old man refilled and lighted his pipe. He took a couple of long reflective draws that sent the smoke lazily drifting towards the window.

"It all gets back to th' same thing, Bucky. Captins is so oftin thoughtless. They do not r'alize their opporchunities and their juties. Many a captin would die of mortification if he knowed what his lootinants did think av him.

"Five juties there are: to insphire a lad to study th' art av war; to give him plenty of well-rounded experience undher proper guidance; to kape his mind focussed upon th' subjick av leadership, and tache him about ut; an' first, last, an' all th' toime, to make a sojer av him. Thin finally,ut is absolutely nicessary thot th' lootinant be give a chanct for satisfaction in his work."

Another pause, and the speaker's voice grew a bit husky.

"I hope great things from me own boy, Bucky. He graduates from th' Point in June. He is boun' to make good, but"—a couple of violent puffs—"be all th' Saints, I hope he gits th' right captin!"

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FOREIGN LANGUAGES.

BY MAJOR-GENL. SIR W. E. IRONSIDE, K.C.B., C.M.G., D.S.O.

THE officers of the Royal Artillery have always been foremost in the Army as regards the study of Foreign Languages, and we can well be proud of the record achieved since the Armistice once more gave us leisure to work. Still, there are many officers who hesitate to embark upon what they consider a difficult and perhaps unremunerative study, and it is with a view to encouraging these officers that the writer has written this article.

English Public Schools give an excellent grounding in French. I do not think that it is possible to escape the study of French at a public school. The groundwork is often taught in a slow and tedious manner, but still the grounding is excellent. A good deal of the drudgery of language learning has already been broken in the case of the British officer as regards French. Is it not a thousand pities that that groundwork should not be turned to practical use? Very little more study is required, and with the incentive before one, it will be found that progress will be much quicker than it was in one's schoolboy days. It is a pity not to complete one's education. Now as regards the utility.

Surely, the late war has shown us that we are likely to be allied with foreign powers, and that combined action will be frequent. The helplessness of two commanders, who cannot speak each others languages or some common language is truly pathetic. The introduction of an interpreter may divulge a secret and will never be satisfactory. Personality loses its value. How can one impress one's personality upon a man who cannot understand your best rhetorical efforts. I well remember being called as Interpreter between two distinguished commanders, or rather to be ready to interpret if necessary. My commander was ushered in to the foreign commander, and the door closed. I and my foreign opposite number waited outside for full twenty minutes. Neither commander knew a word of the other's language, of that we were sure. I turned to my companion and said "What do you think they are doing?" His laconic reply was "Kissing, perhaps." In fact they could have been doing little else.

Personality is a great thing in war. If you can address a man in his own language with fluency, and he cannot do the same in yours, you establish a moral superiority at once. It is a mistake to think that you may lose because your fluency is not perfect enough. Give whatever personality you have, a chance to take effect. You will get more out of an ally, and more out of an enemy.

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Various descriptions of what took place at the Peace Conference have been given, but what struck me most, was the terrible handicap placed upon these big men through their inability to understand each other. One would stand up and deliver a highly polished speech, interlarded with quotations and accompanied by gesture. He would then step back while the Interpreter explained what he had said. The others often did not even pretend to take any notice while one was speaking. What a dreadful dead-alive affair. Someone will perhaps invent a translating gramophone, but until then the man with one language only at his command is at a disadvantage.

And the study of a foreign language is of itself broadening in effect. One cannot study a language without coming into contact with the people who speak it, and without digging a little into their literature and thoughts. One is able to avoid the cosmopolitan froth which simmers on the top of every nation and to get into touch with the mentality of the people. One becomes a better judge of character. There is no more frequent mistake made than that of regarding the nations in Europe as having the same point of view or manner of thought that we have. They have not, and unless you know their language sufficiently well to get about amongst the people you will not know their real characters.

Could the late Field Marshal Sir Henry Wilson have understood our French Allies so well and have engendered such confidence in them, had he not been able to speak their language?

The utility is beyond question.

Now as to the possibility.

So often has the cry been raised "Oh, the English are bad linguists" that it has become a sort of proverb. But I maintain that this proverb is as false as many others. There cannot be anything inherently impossible in learning a language. A child does it. It is true that the child has nothing else to do, and is eager to speak and has an extraordinary imitative power, which adults seem to lose. Still, with the incentive and desire and a trained brain, an adult should be able to rival a child in all but perhaps one thing in language learning. That is perhaps the accent.

There is certainly nothing inherent in the British language which makes the learning of another more difficult than is the case with a foreign language. The chief reasons that a Britisher does not learn foreign languages, seem to lie in two things. Firstly, the widespread area over which his own language is spoken and secondly, his natural diffidence and horror of ridicule.

Foreigners will tell you sometimes that the Englishman forces his personality upon everybody by making them speak his language. The jargon of the Krooboy in West Africa and the Chinaman in the East, when talking to a white man, is pidgin English. There is a great deal of truth in this, and there is a danger that the Britisher who goes out to a foreign country and learns the language perfectly, may perhaps adopt some of the manners and customs of the country, which may be opposed to British ideals, and thereby lose his value. This, however, cannot happen to the educated man who is not exposed to foreign influences for long periods. The natural diffidence is cer-

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tainly a factor to be contended with. There are so many proverbial jokes of the class of "stop ze fox, stop ze hunt, I tumble, I fall off" class that the Britisher thinks that his efforts will be ridiculed likewise abroad. This is not so. The foreigner will listen to the murdering of his language with complete politeness, which is a contrast to the stupid giggling that so often takes place in England when a foreigner makes a mistake in speaking English.

It is not the difficulty of say, Czech or Hungarian which makes those, whose language they are, good linguists. It is rather the necessity of learning another language in order to keep up in the race of civilization, which makes them learn with more energy. There was no more widespead belief than that the Russians were good linguists. A few were, but the majority of the officers of the army spoke far less of a foreign language than do the British officers, say, French. In the counting houses of Copenhagen and Rotterdam it is possible to find the most wonderful linguists, but not more so than amongst the British officers in India. Here can be found the proof of the possibility of learning a foreign language, if one is really required. Very few officers fail in the linguistic tests required for retention in the Indian Army. Many learn several Oriental languages, absolutely foreign to their own. Our officers learn very much more quickly and efficiently than do the French in North Africa.

As regards the language that should be studied. I have already stated that practically every officer possesses a good grounding in French. This should be turned into proper fluency. French is the language of our ally, France, it is the language of diplomacy and of society. It is the language known to the largest proportion of foreign military officers on the continent, speaking any language besides their own. The largest library of military works in the world exists in French, and modern military works are cheap in France. There will be so many opportunities to keep up a knowledge of French, by talking and reading, that an officer need not fear losing the knowledge he has gained through disuse.

If an officer has become enamoured of the East, he will doubtless not have become so without starting on the study of Urdu, and he may decide to go in for service in the East. If he does so, he must learn languages. I well remember my first exercise with Indian troops. I was an R.H.A. Subaltern and found an escort of native cavalry detailed to me under a native officer. We could not speak to each other and the show fell down. There is so large a native establishment in a battery in India, that it is an absolute necessity to know at least Urdu. Facilities exist for the learning of Oriental languages in London and all officers due for posting abroad, should make a start and not wait to compete with the more or less inefficient Munshi he meets in an Indian station.

The three key-languages as far as the soldier is concerned are French, German and Russian. French has already been discussed. The other two are not often taught at school, and German seems to have fallen out of the curriculum of many schools, more owing to prejudice than to the idea that the language is now less useful than before.

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German will take one over a very large portion of Central Europe, up into the Balkan States and into Hungary. It will take one far amongst the commercial people of Europe. Although it is to some degree barred in the States springing from the old Austrian Empire, it will always be understood. The German military literature is good and very cheap. German is a good basis from which to start further study of the kindred languages of Swedish, Norwegian, Danish, Dutch and Flemish. From German, the other Germanic languages come very quickly.

Russian will take one over the vast territory east of what is called Eastern Europe. It is understood all over the old Russian Empire and in Czecho-Slovakia, Serbia and Bulgaria. It is even understood in many parts of Persia and Manchuria. Russian military literature is not of the same wide nature as that of France and Germany, but much of it is otherwise quite inaccessible, because so little of it is ever translated.

The substance of my advice, therefore, is that every officer should put his French on a proper basis. There is no better incentive than sending in one's name for the interpretership examination or preliminary, according to one's qualifications.

Should an officer desire to go further, then I should advise him to learn Russian, unless he has already a decent facility in German, in which case he should put that language in order.

There are infinite military possibilities open to an officer knowing Russian. Russia's foreign policy must necessarily be opposed to that of Great Britain, and there are many points of contact between the two countries in the East. Russia will come back to sanity, and though the coming back is not likely to be violent, still it will be sure. If ever an officer is compelled or wishes to leave the service, a knowledge of Russian will be a great asset in favour of his gaining some good employment.

As regards the method of learning.

Language learning is largely a matter of memory. There is nothing which so warms up a sluggish memory as the study of a language. It is better than any Pelman system. It is the initial drudgery of collecting a vocabulary which frightens off so many would-be students, before they have given themselves a chance. It is useful, therefore, to be aware of some of the laws of memory.

Memory is exercised by the senses. In language-learning, by sight and sound. When one hears anybody say "Oh, I have no ear for languages" that does not mean to say that the person cannot learn to read a language, but he has probably given up the language after finding that he had difficulty in copying the sounds made by his teacher. It is true that few people have a really good ear, they have lost the imitativeness they possessed as a child, but there are few who cannot make a very passable attempt at imitating a sound.

To show how separate are these two divisions of memory one need only ask the ordinary man how he reads a book. Many read purely by sight, others repeat inaudidly in their brains the sound of each word as they read it. The late Sir Lonsdale Hale told me once that he had an example of this. He used to act a good deal in

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his youth and was accustomed to visualize his words as they were placed on the page. On one occasion, while acting, he turned over the page of his part in his mind, and was horrified to find that the page was blank. He had lost the picture. It was not for several minutes that he recovered his memory. One of the best methods of memorizing a reconnaissance is by making a mental picture, just as if one had taken a photographic plate, and this can also be made useful in memorizing a page of grammar, a page of a book or any writing. This method of memorizing is of the utmost value in the rest of one's life and the practice of it with languages is therefore of very practical use.

The next thing to be remembered is that things which are learnt together, tend to become confused, whereas if separated they tend to remain so. As an example of this, it is a terrible effort of memory to learn up the towns and times of arrival of a train from a Bradshaw, but the effort is made much less if one actually does the journey, sees the places and times the train. Sights and sounds and various incidents occurring, give one an opportunity of supplying hat pegs upon which to hang up the facts—in this case the towns passed and the times of arrival. If any further proof of this is required, let the experimenter take six ordinary words with their English equivalents, put them on a slip of paper and commit them to memory. Then let him place each of these six words and its equivalent upon a separate piece of paper, even making the colours of the paper different, and then place them in different portions of the room, on the mantlepiece, on the door and so on. The effort at memorizing will be found to be appreciably less with the separate slips.

The first thing to be done is to acquire a vocabulary and the moral of these two laws of memory is to avoid long lists of words, such as are given in so many language books, and to exercise both sight and sound.

The last law of memory is that frequent repetition is required. It is often necessary to repeat a word aloud and noiselessly in the brain, and also write and read, for the characters as regards sight are different, as many as twenty or thirty times before it really sticks.

All this is very tedious, but it is the backbone of language learning. Many teachers try to relieve the monotony by attempting talking far too quickly. There are initial words which must be known before sentences can be made, and it is no use starting sentences until the word stock in trade is of proper size.

Both German and Russian have printed and written characters different from our own. These must be learnt like a child does writing in a copy book. Facility must be acquired by writing and reading over and over again by oneself. Little help from a teacher is required. A teacher is required at this stage for the sounds. The teacher should not be allowed to worry much by working away at the sound of the characters by themselves, they should be learnt in words, and these words should be common words and not specially dished up to illustrate a character. The difficult, less frequently recurring characters, can be learnt later as the vocabulary increases. The majority of teachers start off with words like pens, ink and paper,

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apples and oranges and many form the most ridiculous sentences with which the student is loaded to his eternal boredom and disgust.

A start should be made with articles in general use, and it is a very good thing to start in one's bedroom where one starts the day. Substantives only should be memorized, such as razor, soap, towel, sponge, window and any other necessary words as they occur. These should be learnt in association with the article by looking at it. Little slips of paper with not more than six words should be written out and pinned in a prominent position in one's room. Then, when working in one's study, with or without the teacher, and writing and sounding the words, one should bring one's memory back to visualizing the article itself as it lies in the room and the slip of paper as it hangs up. The printed words should then be looked up in a dictionary or list of words, visualized and memorized in the same way. Other rooms or other incidents of ordinary life can be dealt with in the same way until about 100 such substantives have been accumulated and properly memorized. An excellent memory may be able easily to accumulate a great many more, but 100 I have found sufficient for the start.

The next thing to do is to accumulate some adjectives. These should be collected in conjunction with the substantives, the colours with slips of paper or even chalk lines of different colours on an ordinary piece of notepaper or with the various articles in your room. Remember always that the more you can dissociate things the better will you remember them, for instance a green piece of soap, black backed hair brushes and a yellow sponge will help you to remember the words for colours better than a mere list. The common adjectives, such as good, bad, cheap, dear, thick and thin will soon make up a list of about 30 adjectives. Always try to dissociate, even if it is that the water was cold on Tuesday and hot on Wednesday, and, that you have a thick vest and a thin vest to put on if you want them.

All this will appear very elementary, but the system soon becomes automatic and it is certainly a great means of lightening the effort of memory, however childish it may appear at first glance.

The next things to learn are are verbs 'to be' and 'to have'. The former is nearly always irregular and in Russian both these verbs are practically non-existent. Indeed, the formation of sentences in Russian is very easy in the initial stages, for one says 'I Russian' instead of 'I am a Russian' and 'To me a horse' instead of 'I have a horse'. The pronouns must be learnt with these two verbs as an integral part of them.

Up to this stage, a teacher is really only necessary for the sound part of the memorizing and the other work depends upon oneself and can only be done by frequent repetition by oneself. It is certainly a grind.

It is now time to form sentences and for this one must go to a grammar and see how the words are declined. There is no better system than repeating and writing the ordinary words you have accumulated with their terminations, and gradually mixing them into sentences. 'I have a razor' 'I have two razors' 'I have a blunt razor'. You will then find that in order to employ the cases in your substantive you have to acquire some more verbs, and some prepositions.

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Employ the teacher to build up sentences with your vocabulary such as 'I give you a razor' 'I walk to the house' 'I walk from the house'. Start by absorbing not more than 4 new verbs at a time.

You must now start a note book, in which to put, firstly your sentences and secondly, any new words you acquire. Do not let the teacher force words upon you. Try and voice a thought of your own and make your own sentence. You will remember it much better than if you absorb one of his. This is only association again. 'I want to buy a horse to-day', will be remembered more than 'Where is my aunt's pen' which is the sort of thing he will produce for you.

Read and re-read the things in your note-book. Write and re-write them, until you have them memorized by sound and sight.

By this time, a time dependent upon what you have done yourself and the strength of your memory, you should be ready to start regular work on the lines of the Interpretership examination. Do not take more than two lessons with a teacher in each week, remember that for every hour you do with him you want five by yourself for repetition and absorption.

If you can get leave, now is the time to go abroad and soak yourself in the language. If you cannot, you must continue more slowly by yourself. Do not go abroad until you have had two months work at about one hour a day at the preliminary work as suggested.

Now decide upon some good Russian work, such as Tolstoi's Anna Karenina, and buy a good English translation as a crib. You should then start translating short pieces backwards and forwards from the book and the crib alternatively, analysing sentence by sentence. Your note-book should now begin to collect sentences of the most varied kind, and the principle you should work on is as follows. Remember to go slow and not to collect more in the note-book than you can memorize. I have often found it necessary to stop all fresh work for a week in order to make up back work in memorizing.

Work in the note-book should always be based upon some basic word, and one should try to accumulate two things :—

(i) The way words are formed from the basic word.
(ii) The idiomatic use of the word.

Always use an English word first in your book, as it is much easier to translate from the Foreign Language into English than vice-versa.

As an example. In your reading, in say, Russian, you come across the word 'Robky', which you find means 'timid'. Your note-book should then show something as follows : No attempt has been made to spell euphonically.

Timidity	} =	Robkost.
Timidness	}	
Timid	=	Robky.
Timidly	=	Robko.

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This gives the relationship of many adverbs and adjectives to the substantive of this nature. It will be soon realised how to make similar words in all cases. The word 'timid' should at once suggest to you in English other English words such as 'intimidation' and 'intimidate', which though formed from the English word 'timid', require a totally different word in Russian.

As another example, take the word 'Molchatch' which will be found to be 'to be silent'. The note-book should then contain

Silence	=	Molchanie.
In Silence	=	Molcha.
Silent, Taciturn	=	Molchalivy.
To be silent, Remain silent	=	Molchatch.
Silentness, Taciturnity	=	Molchalivost.

The word also suggests, other English words, such as 'to break silence' 'to silence guns' 'to silence with a glance' and adjectives usually employed with silence should be added such as 'a dismal silence' 'complete silence' 'silence will be maintained' and the adverb 'silently' should be added in some such expression as 'slowly and silently'.

The note-book should be very carefully written in clear characters, so that the visualization can be made, an untidy book preventing the full use of this sense. It is useful to write the English on one side and the Foreign language on the other, and to number the pages. You should then, in your repetition, run over ten pages at a time and mark the date upon which you had the sentences properly memorized. Return about once a week or fortnight as you find your memory improving.

Lastly, as it is necessary to try and think in a language, a useful exercise, in default of being isolated amongst foreigners, is to sit down and look round at the objects near, and think of the foreign word instead of the English word, making up small sentences spontaneously such as 'I like that horse' 'The station is very full' 'I must have the windows cleaned'. If you are stumped, write the English sentence down and ask your teacher to give you the foreign equivalent. Spontaneous sentences give you your daily requirements. Always refuse to have sentences forced upon you by the teacher. Make your own always.

The books you require are :—

A good dictionary.
A good grammar.
A Military Terms dictionary.

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A foreign equivalent of F.S.R.
A Standard work in the foreign language.
A good translation of the same.
Old examination papers.
Extracts from the *Times* Foreign News page.
Manuscripts.
Your own F.S.R.

A language cannot be learned without effort, but the student should not despair in the early stages. They are by far the most difficult, and facility comes wonderfully quickly when the vocabulary has been acquired. The above notes give the method by which the writer has been greatly helped, and it is hoped that they may be of use to any young officers who wish to commence a study of languages.

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ANTI-TANK DEFENCE.

By CAPTAIN R. HILTON, M.C., D.F.C., R.G.A.

IN the title of this paper the writer particularly wishes to emphasize the word "defence," in the hope of removing at the outset a certain "red herring" which is frequently dragged out when this important and rather complicated question of tank fighting is under consideration. Sooner or later during such discussions someone usually expresses the opinion that "the best antidote for hostile tanks will be our own tanks." It is this obvious and indisputable truism which is almost always responsible for obscuring the issue and leading the hunt right off the track of the vitally important question—"How are infantry when holding positions to be protected against tanks?"

Tank versus tank.

The idea of fast tanks operating against one another at high speeds is so fascinating it is comparatively easy to visualize, and it saves further thought. Therefore it usually clinches the argument.

Moreover it is probably perfectly true that tank-versus-tank actions will be a great feature of future wars. They will grow in importance and will frequently take place between two approaching armies, or on the flanks of the armies in contact. The results of these battles will naturally influence considerably the result of the main battle, but they have nothing to do with solving the problem "How are infantry to be protected against tanks?"

Aeroplanes are the best antidote to aeroplanes, but they do not render unnecessary anti-aircraft fire from the ground. Counter-battery artillery is the best antidote to hostile artillery fire, but yet infantry still have to seek their own protection from it, by cover, etc.

In this paper it is proposed to confine the discussion to the purely local problem of defending infantry positions against tanks. In this connection our own tanks can no longer be the correct solution.

Firstly, they will not be available for such a purpose. It will be many years before any nation has sufficient up-to-date tanks for any other purpose but their present legitimate rôles. To use them for local defence it would be necessary to take them away from where they can develop their maximum power and to lock them up in little scattered units and in a purely defensive capacity. Such a disposition as this would very seriously deteriorate from the efficiency of the tanks owing to the difficulties of maintaining, relieving and refitting such small scattered units. Tanks cannot therefore be made available for the permanent accompaniment of infantry units as their means of defence against tanks.

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There are however two additional reasons against this. These preclude the use of any mechanically mounted weapon whatever, such as a special form of "defensive tank" or a self-propelled anti-tank gun on any sort of track mounting.

In order to continue to exist at all in the forward area of modern fighting every man, gun, or machine of any kind has to make use of either concealment or adequate armour, usually the former. The tank is the first modern weapon which dispenses with concealment when in action and relies on armour. This armour is adequate *when the tank is used legitimately*, because then it is almost continually on the move, and it does not hang about in exposed positions when its job is finished. No armour can be made adequate to protect a machine which has to hang about indefinitely in the forward area, and which is tied down to the defence of a certain area.

It is well known that tanks are liable to severe loss if they remain on a captured position too long. Their job is to appear suddenly, finish their task quickly and disappear.

Mechanically propelled machines cannot be concealed indefinitely in the forward area. They cannot be adequately armoured except against small arm ammunition. Therefore they cannot be used for local defence.

Finally, the infantry must have a means of protection which can accompany them everywhere. Otherwise what will happen if they have to pass through a belt of "non-tank" country and hold their own in country fit for tanks the other side? One has only to consider an advance over almost any typical piece of country (other than Salisbury Plain) to see that this might be quite a common occurrence.

Requirements of local anti-tank defence.

The conclusion appears to be that the local anti-tank defence of infantry must be entrusted to one of the more "old fashioned" types of weapon.—In fact what is required is an animal-drawn piece which is capable of accompanying the infantry closely, and of *existing* under forward area conditions by the orthodox methods of concealment and cover.

The 3·7 inch howitzer has accordingly been appointed to be the anti-tank weapon of the British Army. If this were the final decision in the matter the writing of these remarks would be an inexcusable waste of time. But is it the final decision?

The official doctrine appears to be that the infantry must not be burdened with any further encumbrances if possible. Every effort is quite rightly being made to relieve the infantryman of some of the enormous load of "junk" which he had thrust upon him during the course of the war.

If possible the anti-tank weapon is to be an artillery weapon, and it is to be such that it can also be employed for some other artillery work.

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Close support of infantry.

So far this "other artillery work" has been taken to mean the close support of infantry, and efforts have been made to find some weapon which will combine the characteristics suitable for both. Hence the 3·7 inch howitzer.

This may or may not be an admirable weapon for the close support of infantry. That has nothing to do with the point under discussion. It is quite obviously not the most ideal weapon for anti-tank use. Considerable doubt appears to exist as to its suitability for such work at all.

However, assuming that its performance as an anti-tank weapon is satisfactory, there is still no doubt that a much better weapon could be devised for this purpose. Rightly or wrongly one can hardly avoid the impression that the 3·7 inch howitzer has been chosen chiefly because it already exists! It is something to go upon—a basis for future improvement.

Even apart from this particular weapon, it would appear that any attempt to combine the rôles of close support and anti-tank defence in one weapon is bound to result in a rather indifferent weapon for one or other of these duties.

Beyond the fact that in both cases a piece is required which can be moved in draught by about one animal, their further respective characteristics are generally contradictory.

The ideal anti-tank gun would be a small high velocity gun (3-pounder to 6-pounder) designed for flat trajectory fire with direct laying, and with a wide and swift top traverse and a rapid rate of fire.

The ideal close support weapon is a small howitzer, or at any rate low velocity gun (6 to 20-pounder), designed for indirect fire at short ranges, and hence requiring a curved trajectory. Little or no top traverse is required, and the rate of fire is unimportant.

If the present 3·7 howitzer is an efficient close support weapon, which it certainly appears as though it ought to be, is it wise to spoil it as such by attempting to give it an opposite set of characteristics specially as the result is bound to be rather an indifferent anti-tank weapon?

But let us consider again the ideal anti-tank gun described above, in connection with the official view that an anti-tank gun must also serve some other artillery purpose.

There is another artillery purpose for which such a gun could be employed, with far less need for modification and compromise on both sides than is the case when combining the functions of anti-tank defence and close support.

It is also one of considerable importance, for which up to the present there is no adequate provision. I refer to the protection of forward area troops against low-flying aircraft, not only the "ground-strafing" machines but those carrying out close reconnaissance and artillery work from comparatively low altitudes.

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Low-flying machines.

War experience shows that for all such machines there is a layer of air between about 3,000 and 4,000 feet in which they are comparatively immune, both from S.A.A. fire which is very effective up to about 2,500 and the other two principal anti-aircraft measures which are effective at greater heights.[1]

I think that almost any Corps pilot or observer would agree that for work in the forward area (i.e., not counter-battery work) the safest height to fly was between those two limits, and in moving warfare very much can be seen from such a position.

In "ground-strafing" also it is a mistake to suppose that machines were continually skimming the tops of the trees. If they had done so their field of view would have been so restricted that most valuable targets would have escaped their notice.

What they actually do is to cruise at about 3,000—4,000 feet somewhere up and down the front line. Thence very little movement can escape their notice for two or three miles behind the enemy lines, and they themselves *at present* are comparatively safe.

Having seen some transport, etc., they dive down very close to the ground and attack it and then quickly climb out of reach of S.A.A. fire from the ground to look round for another objective. Hence it is only for comparatively short periods that A.A. Lewis guns, etc., can hope to annoy them, though certainly very effective during those short periods.

Increase in the climbing power and "zooming" power of machines will tend to make these periods shorter still. It is useless then to increase the quantity of S.A.A. defence against low flying machines. What is required is something which can hit them between 3,000 and 4,000 feet *even when just behind their own front line.*[2]

This function, it is believed, could easily be combined with the ideal anti-tank gun outlined above. The only modifications required would be :—

(a) Possibility of elevation up to 45°.
(b) Another type of ammunition.
(c) A slightly more skilled detachment (i.e., fuze-setting, etc.).

After all, the two jobs are very similar—shooting with direct fire at rapidly moving machines. The best positions for both purposes would be the same—about 1,000 yards behind our own infantry with a clear field of view to the front. (A sort of semi-covered position is

[1] Machines under 4000 feet were rarely annoyed by A.A. guns proper, owing to these being usually too far back, and the consequent awkwardness of the angle. Even when immediately over A.A. batteries, fire was for some reason far less effective at low altitudes than when they were at 7000 feet or so. The principal height for aerial fighting activity in the front line zone was from 8000 upwards. Machines below 4000 were rarely annoyed by E.A. probably owing to the difficulty of seeing them from above.

[2] During the attack on Hamel 4th July, 1918, this was actually carried out by a German battery of apparently 50—60 men or so, and very considerable annoyance was caused to our own low flying machines *even when approaching the lines* between 3000 and 4000 feet.

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visualized, with facility for running the gun very rapidly into the open if necessary.)

Conclusion.

The following definite proposals are therefore submitted as a solution to the problem.

(1) The 3·7 inch Howitzer to remain the weapon of close support, but to be relieved of the function of anti-tank defence.

(2) One out of the three 3·7 inch Howitzer batteries in the pack brigade to be replaced by a battery of 6-pounder Q.F. guns, of similar ballistics to those of the 6-pounder 6 cwt. at present mounted in tanks.

(3) This gun to be mounted on a carriage as similar as possible to that of the howitzer, but allowing for free and wide top traverse and steadiness when firing rapidly at low elevations. The gun to be capable of rapid elevation up to 45°.

(4) The battery to be organised on exactly the same lines as the other batteries of the brigade.

(5) Single animal draught to be used for the gun whenever possible in the forward area assisted by the detachment with drag ropes.

(6) Ammunition (A) against aircraft, or hostile infantry in the open, either :—

(a) Shrapnel,

or (b) H.E. with time and percussion fuze and a good fragmentation,

or (c) Shrapnel combined with H.E. (like certain German A.A. shell), if this can be made effective for such a small calibre.

The selection would be a matter for designers, but it appears probable that (b) is most likely to give best results in view of the very small calibre.

(B) Against tanks, either :—

(d) Armour piercing H.E.,

or (e) Armour piercing powder-filled,

or (f) H.E. with a non-delay but not instantaneous fuze.

Here again the selection is a matter of what can be managed. Of course (d) would be the best of the three, but apparently there is difficulty in designing a safe H.E. of this size with a base fuze. Hence (e) as a very poor alternative.

But personally it is considered that (f) could be made quite sufficient against tanks, without the necessity for armour-piercing, as long as the fuze gave sufficient delay after hitting the armour and yet not too much. The armour of tanks can scarcely afford to be increased, or else they will become slow and cumbersome and too vulnerable to field artillery and the 3·7 howitzer.

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At any rate only two types of ammunition will be required, possibly the following :—

H.E. with T. and P. fuze for low-flying aircraft,
hostile infantry in the open.
fleeting targets of all sorts.

H.E. with non-delay fuze for tanks,
machine guns or snipers in houses, etc.,
barricades in street fighting, etc.

In fact it is submitted that such a weapon would not only do two very important tasks which are not adequately performed at present but would be a valuable assistant to the howitzer for certain forms of close support, since it appears from the range table of the 6-pr. 6 cwt. that indirect fire could be employed under favourable circumstances even at reasonably short ranges.

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THE NEAR EAST PROBLEM,

Compiled from "The Times" and "The Nineteenth Century and after," to assist officers in promotion examinations.

BY CAPTAIN M. N. T. GUBBINS, O.B.E., M.C., R.G.A.

History.

IT appears to many that the "Near-Eastern" problem is one of the many problems which have arisen since and which owe their origin to the war. This is not the case and any such impression tends to produce failure to obtain from past history, lessons which would be of great help in the making of future history.

Turkey has been surrounded by enemies since the 16th century, the chief of which was Russia. It is important to understand what were the aims of Turkey's enemies, which were the countries that supported Turkey, and what were the reasons which prompted them to do so.

During the 16th century the Turks were constantly in conflict with the Russians. Peter the Great in the 17th century aimed at extending his empire from the Arctic Ocean to the warm seas of the south. In 1696 he wrested Azof from the Turks, thus establishing a footing on the Black Sea.

It was not until the 19th century dawned that any of the European Powers displayed any interest in the Near East, in spite of the fact that the alternative route to that through Egypt for the traffic of merchandise from the east had for centuries lain through Mesopotamia, Syria and Asia Minor, and from the earliest dawn of history there had been the greatest rivalry to obtain possession of these routes.

The ruling Czar of Russia, Alexander the Great, like all other Czars coveted Constantinople which he called the "key of his house". The younger Pitt was the first British statesman to realise the necessity for holding a clearly recognized and safe "right of way" through the historic gateways of the Near East.

The Turks, though brave soldiers, have always been indifferent to details of administration, with the result that Greeks have always possessed considerable influence in all branches of the Government. In 1821, a Greek insurrection broke out, and during the struggle for independence that followed, massacres on both sides took place. The Sultan proclaimed a holy war, which gave Russia a not disinterested opportunity to take action against the Turks.

The intervention of the Powers brought about peace which confirmed the independence of Greece in 1832.

The Albanians, shortly afterwards, overran Palestine and Syria, inflicting crushing reverses on the Turks. France was then aiming at Egypt to cut the vital cord of communication of the British Empire,

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and England was preoccupied with domestic affairs, so that Russia alone of the Powers intervened with offers of assistance to the Sultan, ostensibly to save his Empire, but with the lure of Constantinople and the Straits as the obvious reason. A treaty was signed between Turkey and Russia in 1833 which practically made Turkey the vassal of the Russian Empire, and stipulated that whilst the Straits were to be free for the passage of Russian war vessels they were to be closed to all other Powers. This alarmed the Western Powers, and by the genius of Palmerston this treaty was annulled by the concerted action of Great Britain and France.

Then followed the Crimean war which was entered into by Great Britain with the ostensible reason of preventing Russia from becoming the arbiter of Turkey's fate. By the Treaty of Paris in 1856 the independence of Turkey was guaranteed by the Allied Powers, while the Sultan promised to better the conditions of his subjects without distinction of creed or race, the Black Sea was interdicted to vessels of war but neutralised to merchant vessels, and the Bosphorus and Dardanelles were closed to foreign vessels of war so long as Turkey was at peace.

This was a great disappointment to Russia, whose dreams of turning the Black Sea into a Russian lake, with complete control over the Straits and unrestricted access to the Mediterranean seem definitely to have been checked. The Russians consequently during the latter half of the 19th century, with this same object in view, misled by the Indian Mutiny into the conception that our position in India was precarious, embarked on an elaborate scheme of expansion across Central Asia towards the confines of India. England had barred her way to Constantinople and the Mediterranean, therefore England's opposition must be removed by a dagger-thrust at her only vital spot —her great Eastern dependency.

In 1877 the last Russo-Turkish war broke out in the Balkan Peninsula and in 1878 the Turks were compelled to sign the Treaty of San Stefano, which practically abolished the dominions of the Ottoman Empire in Europe, and placed the Balkan States under the protection of Russia. Once again the Russian outposts looked upon the waters of the Sea of Marmora, but once again there appeared a British statesman in Disraeli who appreciated the significance of the sinister advance of Russia towards India and the dire consequences that would result if Russia gained supremacy in the Balkans and virtual control over the Straits. It was therefore rightly insisted that the terms of settlement should be submitted for the concurrence of the Powers. Russia demurred. War appeared inevitable, but the Powers prevailed and Russia consented to the question being referred to a congress at Berlin. The main result of the Treaty of Berlin was that Russia was again thwarted in the Balkans and in the Straits.

The policy of the Western powers hitherto had been to screen the "sick man" from the fury of the "northern blast", but a new influence now arose in British politics which has had a disastrous effect ever since on British politics. Gladstone, deeply imbued with

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the traditions of ancient Greece, and obsessed by an almost fanatical hatred of the Turks, launched a new crusade against them. The policy of his predecessors was reversed in all directions: we withdrew from Afghanistan, the Russians immediately redoubled their efforts in Trans-Caspia and established a new approach on the glacis of our Indian Empire pushing forward an elaborate system of strategic railways in Central Asia: a rectification of the Turkish frontier was made in favour of the Greeks in 1881: Egypt was occupied in 1882. The Porte had lost its traditional friend and at once looked to a new friend for support against the ever increasing northern blasts. The new friend was at hand in the German War-Lord who dreamed of a great realm stretching to the Persian Gulf, and increased his hold on Turkey by backing the young Turk movement.

This movement,[1] started in 1908, was a renewal of the attempt made in 1876 to set up a constitutional representative government in place of the despotism of the Sultan.. The young Turks, backed by the majority of the army, carried all before them, and in 1909 were strong enough to depose the Sultan.

Their ultimate object was to rally the Moslem world and head a pan-Islamic movement to destroy the British Empire, and it was because the movement took this aspect that Germany was induced to resume her intimacy with the Turks. The revolution was supported by the army on which it depended, and re-organization of the army was the strongest German card.

The causes and course of the Balkan wars which ensued are outside the scope of this article, but the Treaty of Bucharest had a distinct bearing on the events of the future. It fomented the hatreds which had ever been the bane of the Balkans. It left the Turk in Europe, and hastened the day of reckoning between Austria and Servia. Behind the unsettled Balkan questions, to which most Englishmen displayed indifference, there loomed still vaster issues—the "peaceful" penetration of the Near and Middle East by Germany, her open challenge to British naval and commercial supremacy, and, over all, the heavy weight of armaments.

Turkey was completely in the power of Germany. A great strategic railway was slowly advanced towards Bagdad and the Persian Gulf.

This brings us up to the time of the Great War in 1914, in which Turkey, as might have been expected, threw in her lot with Germany.

Allied Policy after the war.

Turkey was defeated by British force of arms and in October 1918, an armistice was concluded at Mudros. The treaty of peace was not signed at Sèvres until June 1920, a delay which has since been proved to have been fatal.

In June, 1919, the Turkish Empire was still at the mercy of the forces which had overthrown it. The remnants of the Turkish army were confined to the uplands of Anatolia: British troops occupied Palestine and Mesopotamia and held Syria in trust for France; the French were in Cilicia; the Italians were extending their occupation

[1] A survey of modern Europe. H. W. Hodges.

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over south-western Asia Minor; the Allied Powers reverting to a Gladstonian policy had sent Greek troops to Smyrna. Constantinople, and the Straits were controlled by an allied army; the dismemberment of the Turkish Empire proceeded unhindered; the hour of deliverance of Christian Armenians had come.

But important events had taken place during the long interval between the signing of the armistice and the Treaty of Sèvres. Lord Allenby's army, the only military force of which the Turks stood in awe, had been disbanded. Mustapha Kemal had rallied his broken troops in the fastnesses of Anatolia, repudiated the ministry at Constantinople, and defied the allies. The allies were unable to enforce their peace terms. America refused the mandate for Armenia and Constantinople. Turkey, still waiting to know her fate, favoured by an unduly lenient armistice, had recovered her old time obstinacy and almost forgotten her defeat. When she needed a reminder the Greeks were the only instrument of allied power available. They landed in Smyrna and plunged into an adventure quite beyond their powers which led to the most dire consequences.

In October, 1921, France found herself faced with liabilities in the Near East which could only be sustained by a prolonged and expensive military policy; the effort was beyond her powers. France also formed the opinion that it would be imprudent for her, incorporating as she does in her State millions of Moslem people, to remain at war with the chief Moslem power. She therefore took independent action and concluded a separate treaty with Turkey at Angora, which was concealed from the British Government. Had she acted in concert with Great Britain, whose policy might and probably would have been guided by very similar motives, the crisis in the Near East might have been averted. This undoubtedly gave the Turks the certain knowledge that the allies could be divided and played off against one another.

The military position in Asia Minor was now at a deadlock. In March, 1922, a conference of the allied foreign ministers met in Paris. They proposed an armistice to be followed by a peace conference at Paris. The principal modifications of the Treaty of Sèvres were, that all Asia Minor and Eastern Thrace should be restored to Turkey with a special control in Smyrna, but that Adrianople was to remain Greek. The navigation of the Straits was to be controlled by an International Commission under a Turkish President.

Greece accepted the proposals, but Mustapha Kemal preferred to wait. France had made her separate peace, Italy could not fight, and Great Britain (so the Turks might reasonably argue) would not fight alone.

In July, 1922, the Greeks weakened their front in Asia Minor, and made a foolish gesture of threatening Constantinople. The allied powers warned them against any violation of neutral territories.

The Crisis.

In August, 1922, the Greeks were preparing to evacuate Asia Minor, and the Turks were preparing to attack them. The catastrophe was complete.

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The Kemalists captured Smyrna which they burnt, and their main force advanced north-westwards towards the Straits and Constantinople.

In Constantinople and in neutral zones on both sides of the Bosphorus and the Dardanelles was an allied force of no great strength under Sir Charles Harington.

The allies had to decide at once whether to defend the neutral zones, or to leave the way clear for the victorious Turkish army to advance into Europe.

The French and Italians withdrew their forces from the Asiatic shore at Chanak, but the British commander, foreseeing what would be the result of allowing a Turkish force flushed with victory to occupy Constantinople and kindle the flame in Europe, and realizing that the passage of the Straits could not be ensured without the retention of forces on the Asiatic as well as the European side, stood firm and decided to oppose any advance.

On September 16th, the British Government published a statement of British policy, announcing their determination to oppose by force any infraction of the neutral zones, or any attempt by the Turks to cross into Europe: the British troops in Gallipoli, at Chanak, in the Ismid Peninsula, and at Constantinople were reinforced. Roumania, Jugo-Slavia, and Greece were invited to take part in the effective defence of these zones, and the dominions were asked whether they would be prepared to send contingents.

A joint note was sent to Angora on September 23rd, proposing that representatives of the British Empire, France, Italy, Japan, Roumania, Jugo-Slavia, Greece, and Turkey should meet at Venice or elsewhere to conclude terms of peace.

The allied governments agreed to restore Thrace to Turkey, up to the line of the Maritza and including Adrianople, providing the Turks did not allow their armies to enter the neutral zones during the negotiations. The freedom of the Straits and the protection of minorities of race and religion were to be assured under the auspices of the League of Nations, and the allied troops were to be withdrawn from Constantinople as soon as the treaty came into force.

A preliminary meeting to arrange an armistice was suggested at Mudania or Ismid. The Turks accepted the invitation. Ismet Pasha was sent to represent the national assembly at Mudania, and the allied generals met him there on October 3rd.

The Turks showed no desire for peace or moderation, and made no secret of their belief that they would not be fighting a united British Empire, but a Britain abandoned by her allies, deserted by her dominions, and torn asunder by political differences.

On October 10th, the Armistice Convention was signed, due to the mingled firmness and restraint of Sir Charles Harington, and the unity of allied policy brought about by Lord Curzon. It provided for the evacuation of Eastern Thrace by the Greek army within about 15 days and for its replacement by allied troops, to be progressively withdrawn during the subsequent month as the Turkish administration supported by a Gendarmerie not exceeding 8,000 men gradually took control of the country.

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During the peace negotiations allied troops were to hold the right bank of the Maritza from Adrianople to the sea, there to form a buffer between the Greeks and Turks.

In Asia Minor, both on the Ismid Peninsula and at Chanak,, the British occupation was to continue, the limits of the amended neutral zone being fixed by the Convention.

Problems of the Peace Conference.

The work of the delegates at Lausanne commenced on November 20th. The official summary of the articles of peace, agreed to between the Allies and Greece, presented to the Turks at Lausanne was as follows :—

I. Frontiers of Turkey.

(a). In Europe.

Turkey in Europe will be bounded on the north by the Bulgarian frontier as laid down by the Treaty of Neuilly, and on the west by the left bank of the Maritza.

Opposite Adrianople, in order to provide access to the main railway, a strip of territory on the right bank of the Maritza, including the bridge and the small branch line, will be ceded to Turkey between the river and Karagatch.

A zone of territory to an average depth of 30 km. on each side of the frontier of Turkey in Europe will be demilitarized.

Turkey will renounce all rights and title over all the Islands (except Imbros and Tenedos, which will be given to her subject to the grant of local autonomy).

(b). In Asia.

The frontier with Iraq is to be left to the decision of the Council of the League of Nations.

Turkey will renounce all rights and title over Syria, Palestine, Iraq, the Hejaz, the Arabian Peninsula, Egypt, the Sudan, Lybia, and Cyprus.

II. The Straits.

Absolute freedom of passage for ships of commerce in time of peace, and in time of war when Turkey is neutral. When Turkey is a belligerent, free passage for neutral ships of commerce, Turkey retaining the right of visit and search.

Right of passage for warships in time of peace subject to the condition that the maximum force of any single Power shall not exceed that of the strongest fleet of any Black Sea Power. In time of war when Turkey is neutral, right of passage for unlimited naval forces of belligerents subject to the prohibition of acts of war within the waters of the Straits. When Turkey is a belligerent, free passage for neutral ships of war under the same conditions as in time of peace.

Demilitarized zones will be created on both sides of the Dardanelles and Bosphorus within which Turkey shall be allowed no regular forces, except at Constantinople, and no fortifications.

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No permanent gun or torpedo batteries capable of interfering with the passage of the Straits shall be erected on the European shore of the Marmara or on the Asiatic shore between the demilitarized zone and Darije.

A Straits Commission shall be constituted, under the chairmanship of the Turkish representative and composed of representatives of France, Great Britain, Italy, Japan, Bulgaria, Greece, Roumania, and Yugo-Slavia. The Commission shall have the duty of seeing that the clauses regarding the passage of warships are duly observed. It will exercise its mission under the auspices of the League of Nations.

III. Constantinople.

In order to provide for the security of Constantinople Turkey shall be allowed to maintain a garrison there of 12,000 men and an additional garrison of 8,000 in Eastern Thrace. The Turkish fleet will be allowed to cruise and anchor in the waters of the Straits, and Turkey shall be allowed to posssess naval bases and arsenals.

IV. War Graves.

Turkey shall grant to the Allied Powers full rights over the sites of all cemeteries and memorials, and pledge herself to respect them. She shall, in particular, grant to the British Empire the area on the Gallipoli Peninsula where the Anzac cemeteries are situated.

V. Capitulations.

The capitulations are abolished. This Convention is divided into four chapters.

The first chapter deals with the conditions under which subjects of the contracting Powers shall have access to and be entitled to reside in Turkey. In their main lines these conditions are similar to those prevailing in European countries generally. No special privilege is claimed for Allied subjects.

The second chapter consists of five clauses dealing with fiscal matters. The objects of these is to assure to subjects of the contracting Powers the same treatment as that extended to Turkish subjects. No special treatment is demanded for Allied subjects except exemption from compulsory loans.

The third chapter deals with judicial matters. It lays down general principles designed to secure for Allied subjects the protection of the Turkish Courts.

The fourth chapter consists of a single article dealing with Allied religious, scholastic, and charitable institutions. This article provides that there shall be no interference with the free working of existing establishments of this kind.

VI. Minorities.

Full protection of life and liberty and freedom of worship for all inhabitants of Turkey without distinction of language, race, or religion.

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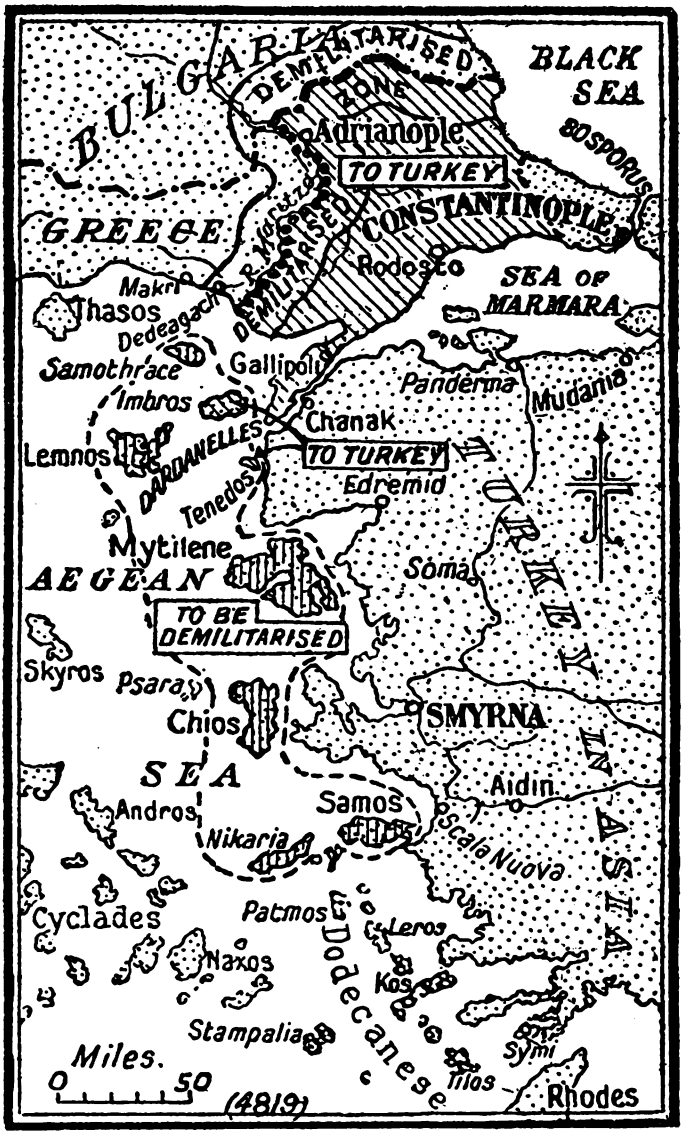

The Turks refused to sign at Lausanne. Ismet Pasha agreed to the Maritza Line, the Straits Convention, and British graves on Gallipoli; and arranged with Lord Curzon that the reference of the Mosul question to the League of Nations should be postponed for one year, meanwhile the question might be arranged by friendly discussion, but the status quo was to be maintained (vide Appendix I.).

The Turks however did not aquiesce to the capitulations, the provisions for the security of foreigners residing in or doing trade with Turkey; nor did they agree to the financial and economic clauses. It was on these two points that the conference broke down.

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The Turks offered to conclude a seperate Treaty with Great Britain and the offer was rejected only out of loyalty to the allies. The conference broke, in fact, upon certain economic and judicial clauses on which the French and Italians would not give way. In 1914, Turkey had negotiated a loan in France, who in return obtained railway and mineral concessions of great importance. Americans were at that time rivals of the French for similar concessions, and since the war the Turkish Government have been anxious to close with the American Company, and consequently have pressed at Lausanne for the restoration of these pre-war concessions.

The Turkish Government after considering the Allied draft treaty rejected it but decided to continue negotiations for peace with the following main instructions for the guidance of the Turkish delegates :—

1. Complete abolition of judicial and financial capitulations.
2. Postponement of Mosul and economic questions for a definite time.
3. Acceptance of cession of Karagatch.
4. Insistence on claim of reparations by Greece.
5. Acceptance of all other points settled at Lausanne.
6. Immediate evacuation of occupied territories by the Allies after the restoration of Peace.

The ultimate treaty of peace with Turkey was signed at Lausanne on 24th July, 1923.

As regards 2 it was agreed that the frontier between Turkey and Iraq should be laid down in friendly arrangement to be concluded between Turkey and Great Britain within nine months, and in the event of no agreement being reached within that time the dispute to be referred to the League of Nations. Both governments undertook that pending the decision no military or other movement should take place which might modify in any way the present state of the territories of which the final fate will depend on that decision.

As regards (4),Turkey in consideration of the financial situation of Greece finally renounces all claims for reparation against the Greek Government, but Greece recognises her obligation to make reparation for the damage caused in Anatolia by the acts of war of the Greek army which were contrary to the laws of war.

The convention relating to the Régime of the Straits agreed to by Turkey was that agreed to by the Allies and presented to Turkey in January, 1923.

The Turks agreed to the demilitarized zones on both sides of the Maritza in Thrace, and on both shores of the Straits of the Dardanelles and of the Bosphorus, but at Constantinople a garrison with a maximum strength of 12,000 men may be maintained. An international commission will be constituted which shall exercise its functions over the waters of the Straits.

As regards capitulations (a) Financial, (b) Judicial, it was agreed as to (a) that nationals of the contracting parties should not be subjected to any tax higher than that which may be imposed on Turkish nationals. The capitulations having been abolished, Turkey will not

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grant to the nationals of foreign countries any treatment more favourable than that accorded to her own nationals. With regard to (b) the Turkish courts will ensure to foreigners in Turkey protection in accordance with international law and the principles and method adopted in other countries.

APPENDIX I.

Mosul and the Lausanne Conference.

Oil has nothing to do with British policy in regard to the Mosul district.

In 1915, when Turkey and Germany were allied against us, the danger to the Empire's line of communication through the Suez Canal became acute. The British Government were exceedingly fortunate in obtaining the Arabs as allies as the result of pledges given to free the Arab race from Turkish rule, and again at a later date, the British Government declared that no part of the Arab countries should be returned to Turkish sovereignty. After the war, Iraq was placed under British mandate, whereby Great Britain is responsible for its defence, for the establishment of good government, and for the maintainance of order.

The vilayet of Mosul is inhabited chiefly by Arabs and partly by Kurds but the Turkish inhabitants are few. The Arabs are as hostile now to Turkish domination as they were in the past.

The Arab people moreover maintain that the retention of the Mosul vilayet is essential as Mosul and Baghdad are economically interdependent. The vilayet of Mosul though poor, grows large quantities of rain-crop wheat, as compared with that grown on irregated land, but it can afford to distribute its produce only by the cheapest form of transportation, which is by floating it on rafts downstream to Baghdad, and until some cheaper form of transport is devised, Baghdad must continue to be the only outlet for the exports of Mosul.

The questions at issue regarding the Mosul vilayet are of interest from the strategical point of view. Through it runs the one great feasible route for armies from the north-west advancing on Baghdad. Basra, and the Persian Gulf.

It is obvious that a small state like Iraq needs as strong a frontier against the Turk as possible. A strong northern frontier is to be found amongst the lofty mountains above the Amadia Valley. It would include most of the valleys occupied by the Assyrians, our mountain friends whose military aid will be as valuable to Iraq in the future as it is to us at the present juncture. This frontier line would also prevent the use of the Amadia Valley for an enveloping movement, threatening simultaneously Mosul from the west down the Tigris, and Erbil from the east through Rowanduz.

The importance of Rowanduz should not be lost sight of. Four roads meet there, eastward a fair road runs to the Persian frontier, thence to Lake Urmia; this was the Russian line of approach. North of Rowanduz is an open plain where large aircraft can land; across it the road runs north to Lake Van or Lake Urmia. Southwards,

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mountain tracks lead to Suleimania. Westwards, the road to Erbil passes through the famous gorge, some 10 miles long, a deep rift in the mountains cut by the Rowanduz river. Here a few troops could easily defy an army.

It should be borne in mind that if we hold the Mosul vilayet, the mountains to the north and north-east will prove another "north-west frontier", which will cause expense and lead to trouble, since Turkey with railhead at Nisibin is well situated for fomenting trouble there, whereas if we give up the vilayet it may prove a buffer against further southward aggression. It seems as if the history of the 1st Afghan war is repeating itself and that we should take advantage of the lessons which were taught us by that war, one of the principle causes of which was our failure to realize that Persian designs on Afghanistan were not then of direct consequence to India, which was protected on that flank by the Punjab, and the Sind and Rajputana deserts, buffer states which constituted no bad frontier.[1]

It has been agreed that the question should be settled by Great Britain and Turkey by friendly discussion within the next few months, and failing agreement during this period that it should then be referred for decision to the League of Nations.

[1] The Oxford History of India.

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EYE SHOOTING WITH A.A. GUNS.

By COLONEL H. W. HILL, C.M.G. D.S.O., R.A.

IN A.A. shooting, there are a number of occasions when the officer controlling the fire has to evolve for himself the necessary lateral and vertical deflections to compensate for the travel of target. Such occasions occur when instruments break down or when such rapid action is required that instrumental results cannot be awaited. In these cases it is quite possible to arrive at extremely good estimations of the vertical and lateral deflections if a few simple rules are thoroughly mastered and a few figures committed to memory.

The great necessity for having these rules and figures always, so to speak, on the tip of one's tongue, is apparent when it is realised that it is at the close ranges—the very ranges at which it is hoped to produce really decisive results on the aeroplanes—that the section commander will most often have to rely on himself for his deflections. At these ranges, it will often be found that instruments give the least assistance.

In all the following procedure, it is assumed that the U.B.2 height finder and a height fuze indicator are available, as without these two instruments there is but small hope of success.

All figures given below refer to 3″ 20 cwt. A.A. guns firing 16lb. shell with m.v. of 2000 f.s.

VERTICAL DEFLECTIONS.

In the first place, a simple method of calculating the vertical deflection will be considered.

For aeroplanes flying horizontally at 80 miles an hour towards an anti-aircraft gun, the following "up" deflections are required :—

Table I.

Future Angle of Sight	Fuze Range				
	4	8	12	16	20
20°	1½	1¾	2	2¼	2½
30	2¼	2½	3	3½	4
40	2¾	3¼	4	4½	5½
50	3¼	4	4¾	5½	6½
60	3¾	4½	5¼	6¼	7½
70	4	4¾	5¾	7	8¼

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At first sight, the above table may seem to be a confused mass of figures, but if the vertical deflections for fuze ranges of 12 and 16 are studied, it will be seen that these figures are approximately one tenth of the angle of sight. At shorter ranges, the deflections are smaller; whilst at longer ranges the correct deflections are obtained by adding a degree or a degree and a half.

The table requires to be carefully studied by A.A. section commanders so that any of the above figures can be reproduced almost instantaneously.

Deflections are directly proportional to speed, if, therefore the speed is 120 miles an hour, the deflection should be increased by half as much again. Of course it is extremely difficult to judge speed correctly, but when the average speeds of the various types are known—as they should be—it is generally possible to make a very reasonable estimation of the actual speed of the particular target under consideration.

It should be noted that the rule refers to the future angle of sight. The present angle of sight can be measured by the height fuze indicator and the future angle of sight taken as being 5 degrees greater for approaching targets.[1]

Direction of Flight.

Vertical deflections depend on the direction of flight. The main courses that should be considered, and the amount of the vertical deflection to be given are as under :—

Table II.

Course		Amount of Deflection	
Coming	Going	Vertical	Lateral
0°	180°	Full	Nil
15	165	Full	$\frac{1}{4}$
30	150	$\frac{3}{4}$	$\frac{1}{2}$
60	120	$\frac{1}{2}$	$\frac{3}{4}$
75	105	$\frac{1}{4}$	Full
90	90	Nil	Full

(Note.—The lateral deflections which will be referred to later are for convenience included in the above table.)

These courses are extremely difficult to judge by eye, but *if the* height fuze indicator is used and the cross wires laid on the target, the fractional value for an oblique course as compared with *that* required for a directly approaching target is often apparent.

[1] This is a somewhat rough approximation; more accurate estimations can easily be made when the general run of the changes in angles of sight has been studied.

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The general method of determining vertical deflections which consists in combining Table I with Table II should be carried out on the following lines.

The section commander orders the height for the height fuze indicator, for example "11000 feet." The reader of that instrument reports "angle of sight 27°, target some distance out of range." The section commander employs the rough rule, noting that he expects to fire shortly at a long fuze range. Hence, vertical deflection $= \frac{27^\circ + 5^\circ}{10} = \frac{32^\circ}{10} = 3^\circ$, and as the range is long, it should be increased to 4°.

Speed is then considered. Speed appears above 80 miles an hour. Hence 5 degrees is a likely correction if the aeroplane is approaching directly.

The direction of flight is then taken into account. The aeroplane is approaching slightly obliquely; therefore 5 degrees is too much, and 4 degrees up is selected and ordered.

The mental processes have been described somewhat fully and it might appear that an anti-aircraft officer who had to think out these corrections would be very slow in issuing orders. It is expected that at first there will be a slight delay, but this slight delay will be amply compensated by the increased accuracy of the predictions. The time taken to work out a vertical deflection should be no longer than the time required to read the following words :—

"Future angle of sight 32°	Hence Up 3.
Long range	Make it 4.
Fast bird	Try 5
Approaching obliquely	Therefore Up 4."

It will be found that the vertical deflection can be deduced in about 10 seconds, but with practice this time can be very much reduced.

Note.—When giving "Up" deflections, it is generally advisable to order them on the big side, the reason being that as the target approaches, the angle of sight increases and therefore some increase in the vertical deflection is required.

Vertical Deflections with regard to constant Height.

The vertical deflections previously recorded should serve as a useful guide for the initial order. It is now necessary to consider the manner in which these deflections change, assuming that the aeroplane is directly approaching at 80 miles an hour and maintaining a constant height.

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Table III.

Height	Fuze	Up	Down	Lateral
15000	20	5	$6\frac{1}{4}$	8
	16	$5\frac{1}{2}$	$6\frac{3}{4}$	7
12000	20	$4\frac{1}{2}$	5	$7\frac{1}{2}$
	16	$4\frac{3}{4}$	$5\frac{1}{2}$	7
	12	5	6	$6\frac{1}{2}$
9000	20	$3\frac{1}{2}$	4	7
	16	$3\frac{1}{2}$	4	$6\frac{1}{2}$
	12	4	$4\frac{1}{2}$	6
	8	$4\frac{3}{4}$	$5\frac{1}{2}$	$5\frac{1}{2}$
6000	20	2	2	$6\frac{1}{2}$
	16	2	$2\frac{1}{2}$	6
	12	$2\frac{1}{2}$	3	$5\frac{1}{2}$
	8	3	$3\frac{1}{2}$	5

The above table is particularly interesting. It will be seen that in the attack of directly approaching aeroplanes only slight changes in vertical deflection are necessary, the reason being that as the angle of sight increases the fuze range becomes shorter. The effect of an increase in the angle of sight is to require an increase in the vertical deflection, but on the other hand the shorter fuze range requires a decrease; the combined results call for an increase of from 1 degree to 2 degrees in the vertical deflection.

It should be noted that the "Down" corrections for a given fuze range are greater than the "Up" corrections.

If height is taken as the basis from which to derive vertical deflections, a very close approximation to the "Up" deflections for long ranges is obtained by dividing the number of thousands of feet of the height by three.

Lateral Deflections.

The following table shows the lateral deflections required for an aeroplane travelling at a speed of 80 miles an hour, offering a purely crossing target :—

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Table IV.

Fuze Range	Deflections
4	4
8	5
12	6
16	6
20	7

At long ranges and big angles of sight there is a tendency for these lateral deflections to be greater as the fuzes burn for longer times. This is shown in Table III which requires to be carefully studied.

It will be seen that the lateral deflections for a given speed depend very greatly on fuze range. The above numbers should be memorized.

Lateral deflections also depend on the direction of flight. The changes in value for various courses were given in Table II.

Lateral and vertical deflections should always be given on the big side to ensure that bursts are not behind the machine. At very short ranges, these deflections should be given in whole degrees as the distance subtended by one degree at short ranges is very small. This is shewn by the following figures :—

1 degree is 1 yard in 60 yards
or 10 yards in 600 yards
20 ,, 1200 ,,
40 ,, 2400 ,,

The above mathematics may appear to be very elementary, but very essential facts which often are not fully grasped are involved.

Conclusion.

An anti-aircraft officer who has thoroughly mastered the general principles which govern vertical and lateral deflections and who takes the opportunity of practising the rapid determination of deflections on every plane he sees should achieve brilliant results. The first requirement is the evolution of these deflections in a systematic manner; the second requirement is speed, and that will come with practice.

The best chance that anti-aircraft guns have of destroying aeroplanes occurs in the first burst of gun fire; afterwards the pilot may be jinking in all directions. It is therefore essential that all efforts should be made to ensure that the initial deflections are correct.

Note.—The various tables in the above article, which refer to the 3″ 20 cwt. A.A. gun firing a 16 lb. shell with m.v. of 2000 f.s., have been printed on a small folding card which is obtainable from the R.A. Institution at 1/6 the dozen, or single copies at 2d. each.

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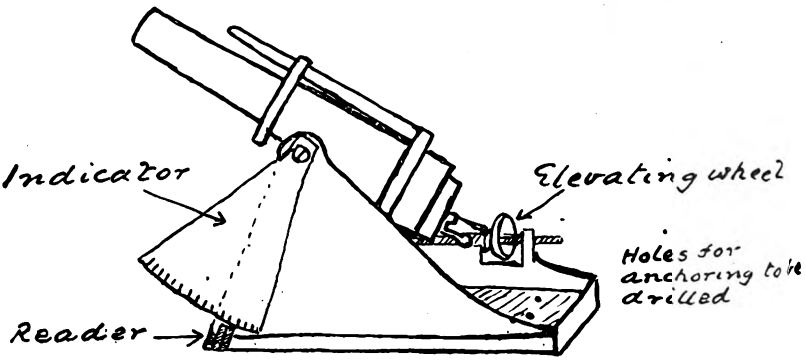
A MODEL HOWITZER FOR MINIATURE RANGE WORK.

By CAPTAIN F. A. YORKE, M.C., R.G.A.

THE small howitzer of which an illustration is given, can be purchased at any large toyshop, but a stock is always assured at Messrs. Hamley, London.

Its trade title is "18 inch Heavy Howitzer," and although approximately modelled from "Mother," the manufacturer, Mr. Britain, informed me that he had given it this imposing calibre in order that the scale of manufacture of all his famous army models would remain unchanged.



War Office (M.T.) sanctioned the purchase of a model after it had been fitted with the additional indicator and reader, and the howitzer was taken on charge at Dover with voucher entitled "Model, instruction in ballistics, with quadrant."

The outlay is so cheap that pending an issue, it will be worth while to give a short statement of its capabilities, should anyone be desirous of buying a model.

The howitzer costs 6/6 and should be the fixed mounting type, as the one on wheels is unsuitably made for the attachment of the indicator. 3 different charges are provided, but additional ammunition can be purchased.

The instructions inside the box must be carefully read, especially those dealing with the rotation of the projectile in flight.

All that is now required is an elevation indicator reading from zero to 45 degrees, the maximum angle of elevation, i.e. the angle between the axis of the piece and plane of the platform being 41 degrees. This indicator is made from a semi-circular celluloid protractor of 2 inch radius costing about sixpence.

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After cutting the protractor to the required arc and being sure that there is enough material left round the centre for the trunnion to go through, bore out the centre point until the hole is just sufficiently large to be of a thumb tight fit round the trunnion, which latter is first unscrewed from the gun and mounting and used as a gauge. Do not over bore otherwise it means a new protractor. The reason of such a fit is because the indicator can be moved to give a gun correction and at the same time remain friction tight during elevation or depression.

It is immaterial to which side of the gun the indicator is attached, but if a section shoot is in progress one gun should have it on the right and the other on the left, as then the two operators do not get in each other's way.

Should the gun be "lazy" through excessive friction on the bearing parts, the battery artificer can drop a little solder into the cradle bearings and thus ensure that which is imperative, namely that the trunnions rotate, and not the gun on the screw threaded ends of the trunnions. Otherwise, while the gun moves, the indicator remains stationary. The reader is cut from the remains of the protractor and seccotined on to the mounting.

The propellant is a spring and the maximum range at full charge is about 12 feet. I need hardly point out that the same spring must be used throughout a series.

About 3 full charge springs per gun should be kept and about 10 projectiles, which latter are so well within standard weight that they can be fired indiscriminately.

Two shillings' worth of fine magnesia powder mixed with ferrous oxide scattered round the target will give a very realistic puff when struck by a projectile, as well as a natural ground effect.

The model is a very interesting and excellent appliance for demonstrating to young soldiers exactly what is meant by the 100% zone, field calibration, registration and danger shoots and to a certain extent how a range table is constructed.

The line element is maintained with reasonable accuracy, and a target 8 to 10 inches wide, is, at the extreme range approximately equal to the 100 per cent. breadth zone.

If a mirror be used in the vicinity of the howitzer the range can be apparently doubled, and the observer with glasses will be forced to concentrate on the target; the rest of the room being blocked out by his binoculars.

N.B.—It is imperative that the last motion of laying should be one of depression, as back-lash being thus absorbed, pressure on the firing pins will not affect the reading on the indicator.

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A MANŒUVRE OF KUROKI*

BY REGINALD KANN.

Translated by

BRIG.-GENL. W. EVANS, C.M.G., D.S.O.

THE death of Marshal Kuroki, which took place last February, marks the passing of the last of the great Japanese commanders in the Manchurian war. Less than twenty years ago the war in the Far East was exciting the interest of the whole world; yet how very remote it seems now, after the great war. The battles that took place are now regarded much as are the siege of Plevna, and the battles of the second empire; and yet there were many very useful lessons to be learnt from the study of the operations, and numerous instances occurred in 1914 which resembled very much the happenings of 1904.

To particularise, Marshal Kuroki carried out a most risky operation at the battle of Liaoyang, which ten years later was repeated by von Kluck in the battle of the Marne.

Marshal Kuroki in command of the 1st Japanese Army had landed in Korea at the commencement of the war with Russia.

On May 1st, 1904, he forced the passage of the Yalu, a river forming the Manchurian frontier, and then marched north-west. On his left were the 4th Army (Nodzu) and the 2nd Army (Oku). The three armies which under Oyama, constituted the whole Japanese force, moved forward converging on the same point; this point was the town of Liaoyang, where the Russian C.-in-C. Kuropatkin, had decided to concentrate all his forces and give battle.

He had organised two very strong lines of defence, one on the range of low hills about six miles south, the other composed of a line of redoubts behind in the plain close under the perimeter of the old city. The advanced line stretched N.W. beyond the Taïtseho, the river which waters the town of Liaoyang. Four army corps occupied this line while two more were in reserve, on either side of the town.

When the Japanese army arrived on August 29th in front of the enemy's position, the very first contact was sufficient to show that they would suffer very severely if they attempted to take it by a purely frontal attack; they therefore determined to turn the enemy's left, in that part of the battlefield where the hilly nature of the

* *Revue Militaire Générale*, September, 1923. "Une manœuvre de Kouroki".

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ground made it possible to conceal to a certain extent the movements of their troops; but there were no troops available to carry out this manœuvre, as all were already engaged.

The 1st Army notably had all its divisions (12th, 2nd, and Guard) fighting the XVIIth and Xth Russian, and the left of the IIIrd Siberian, Army Corps.

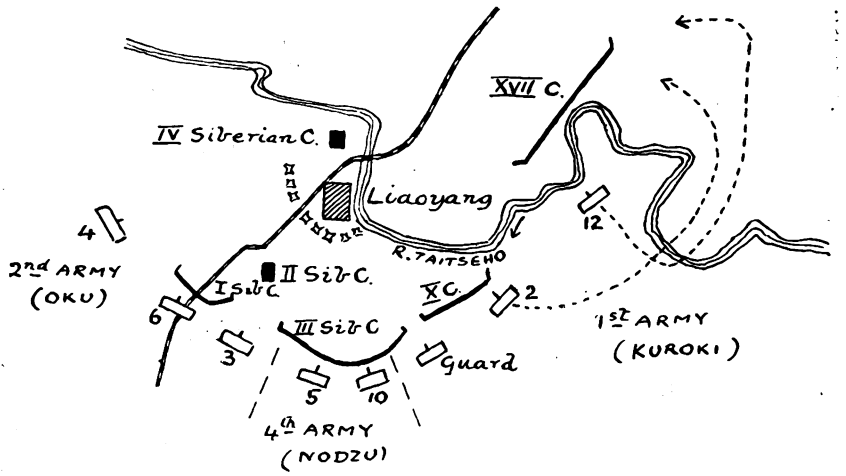
Leaving the Guard Division where it was, without taking any account of the troops facing his, Kuroki made a half turn with his two other divisions under cover of night, moved them east, led them over the Taïtseho, and next day attacked the extreme left of the enemy's line, north of the river.

He thus left a gap of about nine miles in the Japanese battle front, without a single company to meet an attack. This gave Kuropatkin every chance of pushing through the gap opened before him, and cutting the Japanese line into two portions. He did not grasp the opportunity. Flabbergasted by the danger to his single line of communication—the railway from Mukden—Kuropatkin's only thought was to defeat this attack, by sending all the troops he could spare north of the Taïtseho.

During the night Aug. 31—Sept. 1, the Russian Commander-in-Chief withdrew his right wing from the excellent advanced line positions to the line of redoubts, in order to find troops to send to reinforce his left.

On September 2nd he had concentrated no less than 93 battalions, and 332 guns to deal with Kuroki's 28 battalions who were supported by 60 guns, of which half were mountain artillery.

MAP I.



The Russian attempt at a counter attack was pitiable. Instead of profiting by their huge numerical superiority and outflanking the short Japanese line, whose flanks were very exposed, the Russian troops were bunched together in a narrow zone, the regiments one

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behind another in such depth that many were raked by shell fire without being able to fire a single round. This great mass of troops attacked the Japanese in front only.

The culminating point of the fight was a small hill dominating the north bank of the Taïtseho, and which formed the left of Kuroki's new position; here Oskasaki's brigade, told off to defend this position with less than eight battalions found itself attacked by 28 Russian battalions.

There were five successive assaults on the night Sept. 2—3; one of these attacks succeeded in reaching the top of the hill, but a counter attack gave it back to the defenders, who after a heroic struggle managed to maintain themselves in their trenches; further north, the Japanese had surprised and routed General Orloff's division of reservists.

This was sufficient for the vacillating Kuropatkin, and in spite of the superior means still at his disposal in this part of the battlefield, and of the good moral of his troops about Liaoyang, he broke off the fight and gave orders for the retreat on Mukden.

Ten years later almost to the day, the main forces of the German army met the allies between Paris and Verdun. Not only were they not favourably situated to carry out their favourite manœuvre, the envelopment of the enemy's flank, but indeed their own flank was attacked by the 6th French Army (Maunoury) on the right bank of the Marne, west of the Ourcq; at first they could only oppose this by a flank guard formed from a reserve army corps, and a cavalry division. General von Kluck who commanded the army on the flank, resolved not to remain on the defensive, but on the contrary to drive back the attacking army, by turning its flank from the north.

The only trouble was, that like Kuroki at Liaoyang, he had not a single unit in support, or in reserve to which he could allot this task; besides the flank guard opposite Maunoury's army, he had only four army corps under him (II., IV., III. and IX.) and some cavalry.

All these forces had crossed the Marne and were opposite the British Expeditionary Force, and the greater part of the 5th French Army (Franchet d'Esperey); yet Kluck did not hesitate to make the same choice as the Japanese general.

On Sept. 6th he brought two army corps across to the north of the Marne (IInd and IVth) and sent them to the scene of action against the 6th Army. In consequence of this withdrawal there only remained the cavalry to hold the line between Meaux and Sancy; an extent of about 25 miles.

There is no doubt that the boldness with which the 1st Army commander acted was due to his under estimation of the fighting value of his adversaries. He thought that they were so disorganised by their previous defeats as to be incapable of profiting by the opportunities offered to them. This opinion seems to have been strengthened the next day, and it cannot be denied that the events of Sept. 6th went far to justify it.

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The British Army in face of the two cavalry divisions south of Coulommiers hardly made any headway. Further east the III. and IX. German Corps on the line Sancy—Montceaux—Esternay, had been engaged with the French 5th Army—10 French divisions to 4 German.

It was easy for Franchet d'Esperey's force to profit by their numerical superiority to turn the right of the enemy's line which was absolutely in the air, once the IInd and IVth Corps had turned back in the early morning; but our troops, just as did Marshal French's, taught by their experience of August 22nd, avoided risks, disposed themselves in depth and only attacked with caution.

Four divisions were placed in reserve in spite of which, our 3rd Corps which formed the centre of the front line, only attacked with one brigade of its right division, and even less of its left. How different to the time, not so long since, when our infantrymen rushed forward with fixed bayonets, directly they saw the enemy!

Thus the III. and IX. German corps had no difficulty in maintaining themselves throughout the day, and disengaging themselves at nightfall. It was then that Kluck formed a resolution even more grave than that of the day before, and which was bound to affect the issue of the battle decisively.

From the reports he had received from the Ourcq it was evident that the three corps already engaged with Maunoury's army would not succeed unless reinforced; then only would there be sufficient troops to outflank and defeat the 6th Army. Kluck never hesitated. He at once sent for his two remaining corps who were still fighting south of the Marne, the IIIrd and IXth and started them towards the forest of Villers—Cotterets, whence they were to envolop Maunoury's left flank. This new withdrawal widened the extent of the gap in the German line and completely exposed the right flank of the army next to him—von Bülow's IInd Army. Kluck was quite aware of this, but elected to stake his all on the German theory that action against the enemy's flanks alone procures success, and that whatever happens on the fronts of armies facing one another only has a small result on the final result of the fight.

Now such a risky operation as that of von Kluck's on Sept. 7th could never have met with success unless he had been opposed by leaders of the Kuropatkin type, and moreover he should have been quite certain that the action of the III. and IX. corps was going to really produce as dangerous a situation for the allies as that which resulted for the Russian forces from Kuroki's movement against the railway to Mukden.

Here there was no such advantage to be gained, as even if Maunoury's army had been driven back in disorder on Paris, even if it had been hurled into the Marne, the security of the lines of communication of the remainder of the allied forces would not have been affected at all. Moreover, French and Franchet d'Esperey finding that resistance in front of them was weakening, commenced to push forward more rapidly. The German cavalry screen was driven in on

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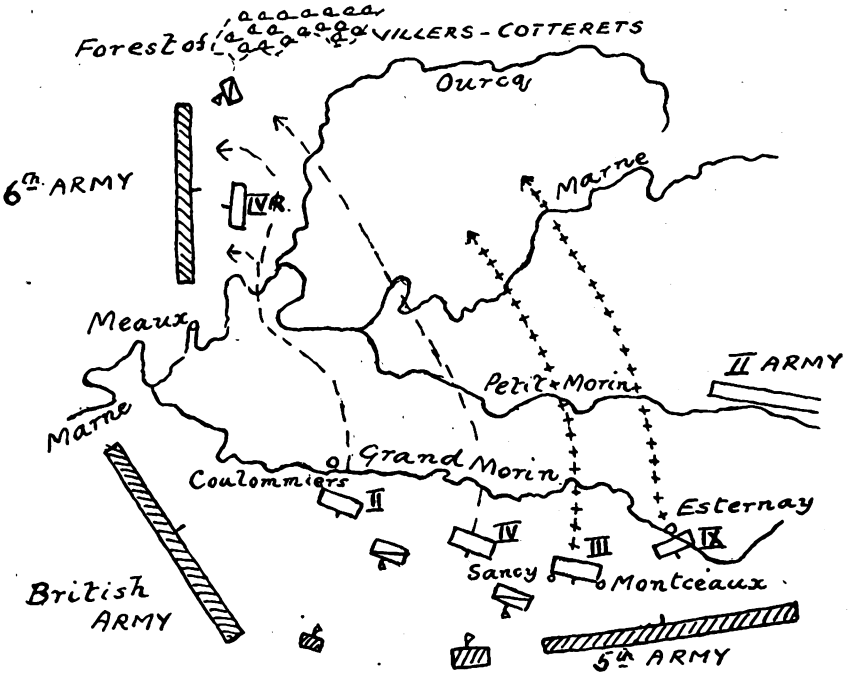
Sept. 8th on the Petit Morin, and the allies penetrated between the armies of Kluck and Bülow, before the encircling movement of the IIIrd and IXth Corps could have had any result; and so it was the lines of communication of the two German armies, that ran the risk of being cut.

Bülow who was most immediately concerned had first to withdraw his right, and subsequently to give orders for the retreat of his whole army, and this brought about the withdrawal of the whole German line. Thus the manœuvre which had succeeded with Kuroki, was fatal to von Kluck; the Japanese general had only embarked on his apparently hazardous movement after calculating the chances of success and its attendant risks.

(MAP II.)



The German general on the other hand was guided by a theoretical principle, without duly calculating the risk; in any case even if the operation based on his theory had succeeded, it would have only resulted in a local advantage, not sufficiently important to justify the dangers to which he exposed the German armies; in fact Kluck preferred an abstract principle to actuality and this was the cause of his defeat.

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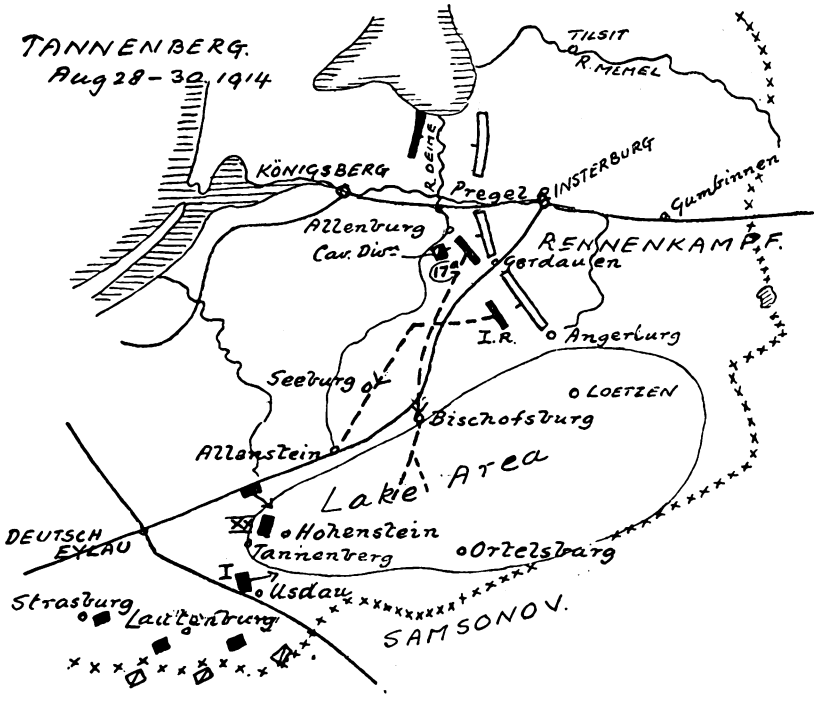
A MANŒUVRE OF LUDENDORFF.

In the preceding article, Reginald Kann has compared Kuroki's action at Liaoyang with that of von Kluck at the Marne.

The battle of Tannenberg, August 28—30, 1914, is another example of how a Russian General allowed troops to be withdrawn from his front without taking any action. Here Rennenkampf allowed Ludendorff to withdraw the 17th and the 1st Reserve Corps from in front of at least four Russian corps, leaving a cavalry division to hold all the ground between the river Pregel and the Masurian Lakes for several days. This inaction on the part of Rennenkampf, enabled Ludendorff to concentrate his troops and destroy Samsonoff at Tannenberg. Samsonoff's losses included 3 army corps commanders and their staffs, and 90,000 men captured, in addition to a huge amount of material.

A very clear account of the battle is given in General Buat's "Hindenburg et Ludendorff Stratèges" from which the map is taken. The main features of the battle are as follows :—

Aug. 22nd 1914. Ludendorff arrived at O.H.L. and stopped the retreat of the VIII. Army, ordered by von Prittwitz, who was superseded on *Aug. 23rd* by Hindenburg, who accompanied by Ludendorff took over at Marienburg on that day. They determined to attack Samsonov's army. Meanwhile Rennenkampf showed no signs of exploiting his victory at Gunbinnen.



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Aug. 24th. The Germans obtained information of the detail of Samsonov's moves.

(Ludendorff says this was got from an intercepted wireless, and as the Germans were always able to read the Russian orders which were sent out by wireless this is quite possible, however, Hindenburg talks of an order found on a dead officer, so Buat suspects that espionage may have had something to do with it).

Ludendorff at once decided to attack Samsonov's two flank corps, and to surround the bulk of his five corps. Samsonov's corps from R to L, were 6th, 13th, 15th, 23rd and 1st. To obtain the necessary strength to be this, Ludendorff left one cavalry division in front of Rennenkampf on a 50 kilo. front and brought the XVII. and 1st Reserve Corps down south as shown in the map.

Aug. 26th. Evening before the offensive the situation was as follows :—

The Strasburg—Lautenburg garrisons were in close touch with Russian cavalry.

I. Corps—Assembled west of Gilgenburg had fought for possession of Usdau which remained in Russian hands.

XX. Corps and 3rd Reserve Division after vainly trying to assume the offensive were W. of Waplitz and Hohenstein.

von der Goltz's Landwehr Division was moving on Hohenstein.

I. Reserve Corps was at Seeburg with orders to continue its march on Allenstein.

XVII. Corps, with a mixed Landwehr brigade had driven back the head of the 6th Russian Corps on Bischofsburg.

Aug. 27th. The two German flank corps succeed in beating the Russian flank corps. The German 1st Corps drives the Russian 1st Corps south, and the 6th Russian corps is in full retreat on Ortelsburg.

Aug. 28th. The circle continues to close round Samsonov's three centre corps, and by *Aug. 30th* they were entirely surrounded and the battle won.

Here the comparison with Liaoyang finishes, but everyone should go on to read the sequel, the first battle of the Masurian Lakes, Sept. 8—9, 1914, when the action of Rennenkampf in keeping all his troops in a strongly fortified position, and allowing his southern flank to be turned, gave the Germans another victory and cleared the Russians out of East Prussia.

Yet another example of the withdrawal of troops from in front of the enemy can be found in General Allenby's operations in Palestine from Oct. 24th, 1917, until the capture of Beersheba on Oct. 31st. For details, see *The Cavalry Journal*, Vol. XI., No. 42, October, 1921. "Operations of the Mounted Troops of the E.E.F." by Lt.-Col. Rex Osborne, D.S.O., M.C., 20th Hussars.

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THE DEGREE, THE MILLIÈME AND THE GRADE.

A review of an article by Lieutenant-Colonel E. Pagezy in *Revue d'Artillerie.*

By MAJOR T. C. NEWTON, D.S.O., O.B.E., R.A.

IN *Revue d'Artillerie* for September, 1923, under the heading "Pourquoi nous ne voulons pas du decigrade" Lieut.-Colonel Pagezy returns to a subject previously raised by him in a different connection. In an earlier article he had written "After having invented the millième and disseminated it among all the armies of the world, the French artillery is about to abandon her child and will in future only speak in the obscure language of grades and decigrades," and he now gives his reasons for believing that the artillery is wrong in "abandoning her child."

Before studying his arguments it would be as well to make certain of the meaning of all the terms used. The units in question are :—

1. The true millième (1/1,000 of a radian, approximately 3·43 minutes, or 6,284 in a circle).
2. The millième 6,400 (approximately 3·37 minutes, or 6,400 in a circle).
3. The millième R or millième 6,000 (3·6 minutes, 6,000 in a circle).
4. The grade (1/100 of a right angle).
5. The degree.
6. The vingtième de hausse (1/20° or 3 minutes).

1. Decisive argument.

All these units have their partisans, but we are all agreed about one thing, which is that there must be unity of language for each category of angles. Thus there is no inconvenience and even an advantage in expressing bearings and angles of sight in millièmes, while expressing the presentation of an aeroplane in degrees. On the other hand it is most important to use the same language to express the value of an azimuth angle or an angle of sight and consequently tc use the same graduations on all sights and laying apparatus.

In the French army, except for the 155 G.P.F. all modern equipments use the millième 6,400. 97 or 98 per cent. of artillery equipments use the millième, 2 or 3 per cent. use the decigrade, and 100 per cent. of infantry equipments use the millième.

In view of the excellence of the French armament, the state of the national finances, and the lessons of the last war, it is very probable that the majority of these equipments will figure in the next war.

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Consequently—

To adopt the decigrade is to perpetuate *ad æternum* the duality from which the French artillery suffered so much in the period when the light artillery used the millième and the heavy artillery the grade.

To adopt the millième is to render possible within a short time and at a very slight expense the unification which is so desirable.

But the millième is not only engraved on the scales of the equipment, it is indelibly impressed on the 150,000 brains of the active and reserve officers. Twenty million francs would doubtless suffice to transform all the graduations used by the artillery, infantry, air force, cavalry and engineers, but all the decrees in the world will never efface the impression left by four years of war and by the work done every day since the war.

It will be noticed that Colonel Pagezy's argument is not so much one in favour of the millième compared with the grade as one for maintaining the status quo. It can be applied with just as much force in favour of retaining the degree in the British service.

2. *Secondary argument.*

Nearly all modern French equipments have the millième and yet the decigrade has been adopted. That is to say a clean sweep has been made. If a clean sweep was to be made, ought the decigrade to have been chosen?

Measurement of small angles—

For the measurement of small angles the millième has no serious competitor. Mathematicians express all their angles in radians, that is to say in true millièmes.

The millième 6400 is too small by approximately 2%, and the millième R is too big by about 5%. For approximate calculations this difference is of no importance. For exact calculations the error is insignificant for angles of less than 50 millièmes 6,400 or 25 millièmes R.

Measurement of large angles—

One could accommodate oneself to any unit but the ideal unit would be the one which best fulfilled the following conditions :—

(a) Uses a decimal figure to express an angle.
(b) Conveys a picture to the mind; facilitates estimation by eye.
(c) Expresses an angle both with the required precision and by the use of as convenient and consequently as small a number as possible.
(d) Facilitates the addition and subtraction of angles; facilitates back laying.

(*a*) The millième, the vingtième de hausse, and the grade all form part of the decimal system and it is just as decimal to divide an arc of 5° into 100 parts (vingtième de hausse) as to divide an arc of 90° into 100 parts (grade).

Even the degree itself is decimal.

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What is not decimal is the minute and all that is necessary to bring it within the general law is, as is often done, to divide the degree into tenths and hundredths.

(*b*) For large angles the degree conveys the clearest mental picture. Then come the units which bear the simplest relation to the degree—the vingtième de hausse (15° = 300 vingtièmes) and the millième R (15° = 250 millièmes R).

Colonel Pagezy then quotes the case of an A.A. gunner estimating by eye the presentation of an aeroplane.

Under the French system the circle is divided into four quadrants of 90°. For oblique targets the quadrant is divided into two halves, thus giving a presentation of 45°, and each half quadrant is further subdivided into three thirds thus giving presentations of 15°, 30°, 60° and 75°. Thus presentation is estimated in multiples of 15°, or to within 7° or 8°.

With the grade it would still be possible to divide the quadrant into two half quadrants of 50 grades, and this angle could again be subdivided into two angles of 25 grades. But for a more accurate subdivision we should have to divide the half quadrant of 50 grades not into three, since fifty is not divisible by 3, but into five parts and our feeble brains cannot visualize so many subdivisions.

In fact we now have the clue to the fundamental reason which makes and will always make the grade a barbarous unit. The number 100 and the number 400 are not divisible by 3. That is the source of the trouble and the cause of the obscurity of the language of the grade.

The Phœnicians and the Greeks knew all the mysteries of the decimal system but they were too open minded to make man regulate his affairs according to a decimal division of the arc described by the sun in half a day. To enable us to classify our daily affairs conveniently within the framework of the hours, this framework must be divisible in more than one way into a series of simple parts. It must be divisible by the simplest divisors and the simpler the divisor the oftener it must be divisible by it.

The number 12 is divisible twice by 2 and once by 3. The number 360 is divisible three times by 2, twice by 3, and once by 5. These are sacred numbers. The second is 30 times greater than the first, wherefore the sun travels 15° in an hour, and it is this that makes the angle 15° such an expressive angle. Multiples of 15°, and especially multiples of 30°, are the angles which convey a mental picture and which the act of looking at our watches and clocks anchors every day more firmly in our brains. How could the grade fail to be beaten in the struggle? It was beaten on the day that the good sense of the public refused to allow the interval between mid-day and midnight to be divided into ten hours.

(*c*) For artillery work a precision of a millième is often necessary. It is nearly always sufficient. A precision of a decigrade is often insufficient. In the absence of an intermediate stage between the deci-

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grade and the centigrade it is often necessary to go as far as the centigrade and to increase the number of figures dealt with accordingly.

(*d*) The decigrade is undeniably the simplest, but the millième R runs it very close.

Thus, to make the subtraction $a - b$, where a is smaller than b.

If a and b are expressed in decigrades, one adds 4,000 to a.

If a and b are expressed in millièmes R, one adds 6,000 to a.

These two operations are each equally simple.

Again, in laying back, in the case of the decigrade the angle a read on the first instrument is replaced by the angle $a \pm 2{,}000$.

In the case of the millième R, the angle a is replaced by the angle $a \pm 3{,}000$.

But as a matter of fact, whatever the system of graduations may be the simplest way of carrying out this operation is to have two reading pointers at 180 degrees from each other.

We are now in a position to reply to the question asked just now—If a clean sweep is to be made, ought the decigrade to be chosen?

The first condition is that, since the laying apparatus is going to be used chiefly to record corrections, the unit chosen must conveniently express small angles. It must also facilitate mental arithmetic. The millièmes of various types are the only units which fulfil this condition. So true is this that officers using the decigrade turn the decigrades into millièmes (by multiplying by 1·6) to find the width of a front measured in decigrades, and turn millièmes into decigrades (by dividing by 1·6) to find the value of a displacement.

The other conditions to be fulfilled by the unit chosen are :—

To express a right angle by a round number.

This is obvious, and it is this condition that eliminates the true millième, if not for angles of sight, at any rate for azimuth angles.

To form part of the decimal system.

The millième 6,400 and the millième R both form part of the decimal system.

To create a mental picture and facilitate estimation by eye.

Since 1,500 is divisible by 6 and by 12, the millième R shares the advantages of sexagesimal and duodecimal division. It bears a simple relation to the degree and gives a better mental picture than the millième 6,400.

To allow of the necessary degree of precision.

The millième 6,400 and the millième R are both equally satisfactory.

To facilitate the addition and subtraction of angles; to facilitate back laying.

The millième R is very superior to the millième 6,400.

Our conclusion is very definite. If we are going to make a clean sweep, the millième R ought to be chosen.

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Then come, first, and almost equally good, the millième 6,400; then, and a long way behind, tenths and twentieths of a degree; lastly, and after all others, the barbarous system of decigrades and centigrades.

The modern fashion is for continual change, and if the graduations of the equipments were not made so permanent we might efface them every year and replace them with some other graduation sufficiently long forgotten to appear new.

Those who dislike unnecessary change and are not passionately devoted to the decimal system in and out of season can draw very clear conclusions from Lieut.-Colonel Pagezy's most interesting arguments. First, the existing system, whatever it is, is probably better than any change however decimal, however scientific, however pseudo-scientific it may be. Secondly, the degree is the unit that makes the clearest mental picture to people of ordinary education. It does not facilitate the inaccurate form of calculation known as mental arithmetic but it is familiar to educated persons all over the world.

Our ancestors left us two excellent units in the degree and the radian. The radian is unsuitable for our purpose so we use the degree. When we look at the list of substitutes and consider that there is no end to the making of millièmes, grades, and other artificial angular units we may well be thankful to our predecessors for not setting out on the endless path of change. No doubt they continually received suggestions and were urged to make changes but they evidently had the useful, if sometimes unpleasant, accomplishment of knowing how to say "No."

No new unit is likely to combine so many advantages with so few disadvantages as our old and trusted friend the degree.

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FOREWORD.

IN the preface to the first edition of his History of the Royal Artillery, Duncan wrote regarding esprit de corps :—

"History has a power to awaken this esprit which it is impossible to over-rate. The power reaches the educated and the uneducated alike; it begets a sympathy with the past which is a sure agent in creating cohesion in the present; for the interest which binds us to our predecessors binds us also to one another. In this cohesion and sympathy is to be found the most sublime form of true discipline."

It may be that in the hustle and bustle of these progressive times the younger generation of officers find less and less leisure to look into the past, yet the war proved that the influence of tradition and history in maintaining and stimulating esprit de corps remains as strong as ever.

And so the Committee of the Royal Artillery Institution has decided to mark the completion of the fiftieth volume of its Proceedings by a special number, the key-note of which shall be "Reminiscence."

The Royal Regiment yields to none in esprit de corps, and the R.A. Institution is the storehouse of its regimental traditions, and yet how many of our officers have any intimate acquaintance with the R.A.I.? Indeed, I have no doubt that some few have never set foot within its doors. For all that it is a very interesting place, and its history is instructive and creditable to the Regiment.

It was in February 1838—more than one hundred and twenty years after the birth of the Regiment—that two subaltern officers, J. H. Lefroy[1] and F. M. Eardley-Wilmot[2] originated a proposal to form a Regimental Institution with the object of improving the professional and scientific knowledge of the officers of the regiment. This proposal was strongly supported by a number of the senior officers then at Woolwich and sympathetically received by the Master-General of the Ordnance.

Amongst the arguments put forward in support of their proposal we find the following observations which tend to show that the originators of the scheme were not without a sense of humour, perhaps of sarcasm.

[1] Secretary R.A.I., May 1838—June 1839.
,, ,, Nov. 1853—Dec. 1854.
Afterwards—
General Sir J. H. Lefroy, K.C.M.G., C.B., Col. Comdt. R.A.

[2] Secretary R.A.I., Sept. 1847—Oct. 1853.
Afterwards—
Maj.-General F. M. Eardley-Wilmot, F.R.S.

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"Young officers will then know where to seek information on practical points as they may want it, instead of being as they now are at a loss where to look for it." Also "Possessing as this regiment has done and happily still continues to do the reputation of being a scientific corps." While the fact is emphasized that "Amidst the increasing diffusion of knowledge a reputation for science cannot long be maintained that has not some solid foundation."

It speaks well for the breadth of mind of the senior officers of artillery of those days that the aspirations of youth were encouraged and that the regiment as a whole subscribed liberally towards the expense of fitting out the Institution. Indeed so well was the proposal received by H.M. Board of Ordnance and supported by the regiment that in less that three years (September 1840) the Institution was a going concern in a building erected for the purpose near the Repository.

The building of to-day was not opened until February, 1854.

The proposal to form a regimental institution was not the first attempt on the part of junior artillery officers to improve their education. In June 1772 Capt. Jardine writing to Capt. Williams suggested a military society at Woolwich for "improvement and amusement, where military, mathematical and philosophical information being the chief objects of our enquiries, essays, etc., knowledge might thus be improved and propagated." He adds "The society might thus communicate and increase their own ideas, preserve themselves from vulgar errors, and keeping one another in countenance bear up against the contempt of pert and presumptive ignorance." He suggests educational qualifications of a somewhat high standard and recommends the perusal of a formidable list of authors both "Ancients" and "of the Moderns."

This Military Society was formed, but does not appear to have long survived the outbreak of the American War in 1775.

During the past ten years under pressure of the war, the development of the science of artillery has been very marked and the regiment has nobly vindicated its reputation as a scientific corps. We may fairly claim to have continued to build up that reputation upon the "solid foundation" postulated by Lefroy and Eardley-Wilmot, and to have borne up against "the contempt of pert and presumptive ignorance" contemplated by Jardine, and in the attainment of this happy result the Royal Artillery Institution may fairly claim a share.

During the 80 years covered by the 50 volumes of the Proceedings the Regiment has seen vast and wonderful changes, and the R.A. Institution has kept pace with these changes. Vol. I covers a period of 13 years and dealt with purely artillery subjects with the object of educating officers in technical matters. Nowadays our technical

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education is well provided for in other ways, and Vol. 50, covering twelve months only, contains matter of more general interest.

Four years of war on an unprecedented scale has made an extraordinary mark in the continuity of the life, manners and customs of nations and of individuals. To-day there exists everywhere, in greater or lesser degree, a line of demarcation between pre-war and post-war times. The Royal Regiment has felt this, not acutely but sufficiently to justify the R.A. Institution in producing a special number with the object of linking up the present with the past and bringing the officers of to-day who have done so much to maintain and add to our traditions into touch with the doings of the Regiment in past times when so many of those traditions were built up.

March 1, 1924.

HORNE.
General.

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THE "PROCEEDINGS R.A.I."

By LIEUT.-COL. H. W. L. HIME.

IN 1838 Lieutenant J. H. Lefroy and F. M. Eardley-Wilmot were the spokesmen of a movement among the young officers "to found some institution as a voluntary association . . . . for the purpose of affording instruction and information to officers of the Regiment on all subjects of scientific interest."[1] By the month of May a Committee had been formed consisting of *President*, Col. T. P. Cockburn; *Members*; Capt. (Sir) T. Bloomfield, Lieut. F. M. Eardley-Wilmot, and *Secretary*, Lieut. J. H. Lefroy. At once a serious difficulty arose in finding a place for their meeting, classes, books and instruments; nor was this difficulty solved until the beginning of 1854, when the present Institution, which took three years to build, was opened. An ancient printing press had been provided and the publication of articles began forthwith. The printing of the articles however did not proceed as smoothly as had been expected, for a reason which may be guessed. The printing press had been in "constant work for the Garrison; so much so as to have obliged the postponement of work for the Institution." [2]

From 1854 to the present day there has been an annual supply of numbers, from two to twelve, except for a year in the period 1875-80. The plates for an article by Sir H. Lefroy miscarried, and the number which should have contained them was delayed until the plates were recovered—a year afterwards. Even during the dark period of the Great War, the proper numbers were issued, thanks to the unquenchable *esprit de corps* of Capt. J. E. H. Orr, who gallantly volunteered to act as Secretary (and Adjutant, R.H.A., in addition to his ordinary work as Secretary, Royal Thames Yacht Club) when the strain and stress of the war were at their height.

To compare the amount of work done at various times it is sufficient to know that Vol. I contains (in about 450 pages) the papers contributed 1848-1857; Vol. II the papers contributed 1857-1861; Vol. XLIX the papers contributed 1922.

There was another series of papers, issued in 1860, called the "Occasional Papers." They consisted of "all papers of minor interest, translations, etc. etc.; while the 'Proceedings' are as far as possible confined to the original papers by artillery officers." But the distinction was too fine for the ordinary person to grasp, and in a short time the "Occasional Papers" collapsed.

[1] "Proceedings," I, 137.
[2] "Proceedings," I, 153.

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In or about the year 1850 a seniority list used to be sent to the Woolwich Mess about once a year, and it was necessary to erase from time to time the names of those who retired or died. This task, by some unwritten law, was carried on by Colonel W. C. Anderson, a Scotch officer irreverently called "Jock" by subalterns. Being somewhat dim-sighted, he used to hand the list to some subaltern, and sitting down with him at a writing table would say (according to Scandal), "read out the cashalties." On this the subaltern might reply "Captain M, or N, died at Malta on such a date." Then the Colonel would impressively say (of an officer he probably knew nothing about) "a gude Christian man; strike him oot." But Scandal could not deny that the Colonel was a fine old gunner who opposed the wretched Gunner-Driver system manfully, and to whose fostering care the Field Batteries owed their very existence at a critical time. He once wound up a warm discussion on the driver question by saying, "The poet says,—'An honest man's the noblest work of God,'—but I say it is a good wheel driver."

As the Department of Artillery Studies (housed with the Institution) increased in size and importance, so the educational influence of the Institution naturally waned; and at length it dawned upon the Committee that unless they adopted another rôle the Institution would sink into a mere Woolwich warehouse. Here was the parting of the way. It was a case in which something must be done and little could be said, and the Committee silently accepted the situation and took for their future objective the diffusion of knowledge throughout the Regiment. To carry out this purpose it was necessary to expedite the publication of the Proceedings, and to do so was not feasible in the state of the Institution at the moment. Much of the time of the Sergeant Major (one of the two only clerks) was occupied in photographing officers and their families; the carpenter's time was wasted in making and repairing their boxes and trunks; and the plight of the printers was worse. Officers got their visiting cards and note paper stamped at the Institution. The printing press was of primitive construction, and printing off (which was done by hand) was a very long and tedious operation; yet the printers were burdened with the correction and printing of the Garrison Directory. A couple of hundred copies were printed every quarter and handed over to some local stationer, who sold them at 6d. a copy and pocketed the money.

When these abuses had been at length and with much difficulty swept away and a gas printing machine set up, it was the moment to convert the casual issue of the Proceedings into a regular and rapid supply; but then arose the perplexing question,—would the Members rise to the occasion and contribute sufficient "copy"? This risk was run, and successfully. A monthly issue was decreed and carried out, and on one occasion only was there a dearth of "copy."

The Institution, however, had not turned its back entirely on education. The drawing classes were still supported, and the allow-

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ance for teachers of foreign languages (for classes of three) was continued, and liberally. When Lieutenant (Maj.-General Sir) C. S. B. Parsons reported that he was stationed alone in a remote part of Egypt, a special case was made of it and his teacher was paid until Parsons passed the examination in colloquial Arabic. On another occasion an officer at the Staff College reported that he could only get one other officer R.A. and one officer R.E. to form a class in Russian, which was not then taught there. This was at once made a special case and the Russian teacher was paid by the Institution. Shortly afterwards certain W.O. inspectors visited the Staff College, and on entering the room occupied by these officers enquired what language was being taught. On being told that it was Russian, the inspectors said that Russian was not included in their lists; and it was then explained to them that the class was supported by the R.A.I. Within a few days a letter reached the Institution saying that the W.O. would support the class in future.

Shortly after the monthly issue began the Institution was flooded with applications from officers of Militia and Volunteers for copies. It was impossible, with only two clerks, to cope with this correspondence. Having obtained, therefore, a legal opinion that the Proceedings were not "private," a number of copies of every issue were handed over to Messrs. Dulau, Booksellers, for sale. Things went well until a deputation of regimental contributors waited on the Secretary and complained that the Institution was making money out of their brains. As there was some truth in this, the matter was argued in Committee and it was decided that the money from the sales should be divided annually among the best contributors by an independent Sub-committee. This plan some years later dilated into that of paying all the contributors. The only papers that ever struck me as being quite below par were written under this evil system, which, let us hope, will never be revived.

There only remains to be mentioned the change in the title of the papers, from "Proceedings" to "Journal," which took place a few years later. This change had been proposed 1880-1886, and was outvoted.

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THE REGIMENT.

Some remarks upon its origin and early history.

BY MAJOR (BT. LIEUT.-COL.) J. H. LESLIE, R.A. (RETIRED).

P.R.O. = Public Record Office. W.O. = War Office.

R.W. = Royal Warrant.

The figures enclosed in brackets after an Officer's name refer to the *List of Officers of the Royal Regiment of Artillery*, 4th edition. 1900. Published by the Royal Artillery Institution, Woolwich.

THE Principal Officers of the Board of Ordnance had made a representation to the Master General on 10 January, 1716,[1] that the existing establishments of the Military Branches of that Office "are so defective, that when there hath been any extraordinary service required, this Office has been obliged to inlist other persons, and to make demands in Parliament for payment of the same."

To remedy this unsatisfactory state of things, the Board submitted a "proposal for a Regimental Establishment of four Companies of Gunners, with proper Officers," etc.

* * * * * * * *

The intention of the Board was to form a permanent Regiment of four Companies, from which "the Foreign Establishments will not only be supply'd but there will also remain in England near 200 persons at all times ready to march upon any extraordinary occasion," etc.

The proposed establishment was :—

No.	RANK.	Pay per diem.
1	Colonel	25s.
1	Lieut.-Colonel	20s.
1	Major	15s.

[1] P.R.O. W.O. 54/199. p. 137.

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No.	RANK.	Pay per diem.
1	Captain	10s.
1	Lieutenant	6s.
1	,,	5s.
1	,, and Fireworker	4s.
1	,, ,, ,,	3s.
3	Serjeants each	2s.
3	Corporals each	1s. 8d.
3	Bombardiers each	1s. 8d.
30	Gunners each	1s. 4d.
50	Mattrosses[1] each	1s.
3	Companies more of the same strength.	

The proposal was only adopted in part.

Two Companies, of the strength as proposed, were established by a R.W., dated 26 May, 1716, but without any "regimental" Staff (Colonel, Lieut.-Colonel, or Major). They were called "marching" Companies and were stationed in England.

An Establishment of Artillerymen already existed at Mahon (Minorca) and in Gibraltar, and as the result of a representation by the Board of Ordnance, dated 11 December, 1716, an Order in Council dated 22 August, 1717,[2] sanctioned a new establishment of artillerymen for these two places, and directed the Officers of the Ordnance to "cause the necessary directions to be given for putting the same in due and effectuall execution accordingly."

At the end of 1717, therefore, we arrive at a regularized establishment of *four* Companies, although not looked upon as, or styled, a Regiment—merely four distinct Companies administered by the Board of Ordnance, each Company being under the command of a Captain.

It is nowhere stated with certainty when the designation, "The Royal Regiment of Artillery," came into use. I have examined this point and arrive at the conclusion that it was adopted in 1722.

The commencement of affairs occurred in 1716, when the formation of two Companies of Artillery took place—see *supra*.

A R.W. of 26 May, 1716,[3] directed Captain James Richards [No. 5. R.A.] "to be Captain of one of the said Companies of Gunners and Mattrosses."

All Warrants granting commissions to Officers and to other ranks, up to the end of 1719, *commenced* with the words :—

"Whereas his Majesty hath, by his Warrant under his Royal Sign Manual, bearing date 26 May, 1716, thought fitt to establish 2 Companyes of Gunners and Mattrosses," etc., but in December, 1720, the wording was altered.

A R.W. of 1 December, 1720,[4] appointed George Deale "to be one of the Gunners belonging to that Company of the Royall Artillery whereof ..... is Captain," etc.

[1] A soldier in the Artillery ranking next below a gunner, and acting as a kind of Assistant or Mate to him. The rank was abolished in 1783, and all mattrosses were mustered Gunners.

[2] P.R.O. W.O. 55/346. p. 355.

[3] P.R.O. W.O. 55/491. p. 5.

[4] P.R.O. W.O. 55/491. p. 25.

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This is the *first* known instance of the use of the designation "The Royal Artillery." This wording continued up to the end of 1721.

On 1 April, 1722, Albert Borgard [No. 1.] was appointed by R.W.[1] to be

"Colonel of His Majesty's Royal Regiment of Artillery."

Two Warrants following this, both dated 1 July, 1722, "nominate, constitute and appoint you the said Henry Maynard to be one of the Serjeants," and "Samuel Seaton to be one of the Bombardiers in the Royall Regiment of Artillery under the command of Collonel Albert Borgard," etc.[2]

This proves, beyond doubt, that the designation "The Royal Regiment of Artillery" came into existence with the appointment of Albert Borgard to be its Colonel, on 1 April, 1722.

The Ordnance Muster Rolls, preserved in the P.R.O., fix the dates on which the orginal establishment of two Companies (1716) was increased to four, and confirm Borgard's own statement[3] that when the command of the Regiment was conferred upon him in 1722, it consisted "of four Companies".

In 1716, when two Companies were formed in England (see *supra*) a Company of Artillery existed at Gibraltar and another at Mahon (Minorca), under the direction of, and paid by, the Board of Ordnance, but not then connected with the Companies in England.

The Company at Gibraltar was commanded by Captain Christopher Brisco. The only other Officer doing duty with it was Lieut. Samuel Little. Neither of them held commissions in the *Royal* Artillery.

The earliest Muster Roll of this Company, dated 25 July, 1719, is headed :—

"Muster Roll of Capt. Brisco's Company of Artillery in Gibraltar,"

and the money received by Captain Brisco on that date is entered as from "Mr. Francis Jeffreys, Paymaster to his Majties. Artillery in Gibraltar."[4]

The Muster Rolls for October of that year, for January, and for April, 1720, and for November, 1721, have the same headings, but that for October, 1722, is headed :—

"Muster Roll of the Company of the Royall Artillery at Gibraltar"

with a certificate at foot :—

"Muster'd then a Company belonging to the Royall Regimt. of Artillery Commanded by the Honble. Col. Albert Borgard," etc.

There is a note after this certificate :—

"This is a true copy of the original sent me from Gibraltar by Lieut. Peter Stepkin." [No. 17. R.A.] (sd) "Albert Borgard."

Brisco and Little had by this time disappeared from the Muster Roll, the Officers now serving in the Company being :—

1st Lieut. Peter Stepkin and

2nd Lieut. John Forbes [No. 16. R.A.],

both Officers of the Royal Artillery.

[1] P.R.O. W.O. 55/483. p. 59. [2] P.R.O. W.O. 55/491. pp. 53 and 55.
[3] Proceedings of the Royal Artillery Institution, Vol. XIII., p. 136.
[4] P.R.O. W.O. 10/6.

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This, I think, proves that the Company of Artillery which was stationed at Gibraltar was merged into the Royal Regiment of Artillery in 1722, just after the appointment of Colonel Borgard, by which time Brisco and Little had been replaced by two officers of the R.A.

There was no change in the personnel of the Serjeants, Corporals, Bombardiers, Gunners or Mattrosses.

The Muster Rolls of this Company in 1723, 1724, and in April, 1725, are headed :—

"Muster Roll of the Detachment of the Regiment of the Royal Artillery in His Britannick Majesty's Garrison of Gibraltar," but in July, 1725, the heading is the same as in October, 1722,

"Muster Roll of the Company of the Royal Regiment of Artillery," etc., and so continues.

The earliest Muster Roll of the Company (or Detachment) stationed at Mahon, is dated 31 August, 1720,[1] and confirms the conclusion arrived at.

The certificate at its foot is worded :—

"Mustered then in his Majties. said Garrison of St. Phillips,[2] in the Island of Minorca," etc.

The Roll is signed by Thos. Hughes, Geo. Aikinheid, and Joseph Egerton, all Officers of the Royal Artillery, [Nos. 7, 9 and 11. R.A.] their commissions bearing date 10 December, 1718.

The Rolls of September and November, 1720, are similar, but in that of September, 1721 (the only one existing of that year) the wording is "In his Maties. Royal Artillery."

This wording continues until August, 1723, when we find

"Mustered then the Company of the Royal Regiment of Artillery," etc.

All this evidence, clearly establishes the fact that the Companies at Gibraltar and Mahon were joined with the two "marching" Companies of Artillery in England about 1721-1722, for administrative purposes, and that when Borgard was appointed Colonel of The Royal Regiment of Artillery, these four Companies constituted the Regiment.

No change in this establishment took place until 1740, when, on 1 April, a new Company was "raised and subsisted," i.e., paid, in accordance with the terms of R.W. of 21 April, 1740, thus making three "marching" Companies in England.

In 1741, these three Companies were "divided into four, and some other alterations made thereto", by a R.W. of 30 April.

In 1743, by R.W. of 7 March, 1742/3, a Company of Artillery which had been raised in 1740, for service in the West Indies (Cartagena Expedition) and which had now returned to England, was added to the Regiment, making a total of 5 "marching" Companies. At the same time these 5 were formed into 6, making with the two Companies at Gibraltar and Mahon, a total of 8.

[1] P.R.O. W.O. 10/8.
[2] Fort St. Philip—Mahon.

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In 1744, two more Companies were raised and added to the Regiment, by R.W. of 5 March, 1743/4.

Prior to 1744 there had been Cadet Gunners and Cadet Mattrosses in each "marching" Company, their numbers varying according to the number of Companies existing. In 1744 there were 3 of the former and 2 of the latter in each of the 8 Companies—40 in all—but by a R.W. of 30 July, it was ordained that they "should be separated from the said companies and formed into one Company of Gentlemen Cadets," with effect from 1 October, 1744, the Company being borne on the establishment of the Regiment.

It will be observed that the Company was a purely Artillery affair, the Engineers being in no way concerned with it.

In 1745 two more Companies were raised—in one Company of which were incorporated the detachments of Artillery then serving in Newfoundland (Placentia, St. Johns, Ferryland, Trinity Harbour and Carboniere) and in the other those serving at Louisburg and Annapolis Royal (Nòva Scotia)—and in 1747 one, making a total of 14, *including* the Cadet Company.

In 1748, by R.W. of 12 December, consequent on the Peace of Aix-la-Chapelle, the establishment of the Artillery was *reduced* by three Companies, the Officers being placed upon half-pay.

Colonel Borgard died on 8 February, 1751, after having commanded the Regiment for nearly 30 years. He was succeeded by Colonel William Belford [No. 34. R.A.].

No further change took place until January, 1755, when four Companies were raised and added to the Regiment. Two more were raised in September, and two more in January, 1756.

In May, 1756, a Company of Miners was "raised and incorporated into" the Regiment.[1]

Four new Companies were raised in January, 1757, bringing the strength of the Regiment up to

1	Company of Gentlemen Cadets.
1	Company of Miners.
22	Companies of Artillery

and these 24 Companies were at the same time formed into 2 Battalions, "with their necessary Field and Staff Officers."

The Cadet Company belonged to the 1st Battalion, and the Company of Miners to the 2nd.

The Staff of each Battalion consisted of

1	Colonel-Commandant.	1	Adjutant.
1	Lieut.-Colonel.	1	Chaplain.
1	Major.	1	Surgeon.
1	Quarter Master.	1	Surgeon's Mate.

There was also *one* Bridge-Master[2] for the Regiment, the annual pay for the entire establishment amounting to £70,116. 10. 0.

[1] This Company is now represented by 2nd Battery, R.F.A.

[2] He had charge of Pontoons, and all equipment and stores belonging thereto.

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1716-1759.

Table showing the dates on which the first 30 Companies were severally raised and the reference numbers of the Royal Warrants, in the Public Record Office, Chancery Lane, connected therewith.

Year.	Date.	Companies.	Total.	Royal Warrant	
				Date.	Reference No.
1716	26 May	2	2	26 May	W.O. 55/406. p. 47.
1722	—	2[1]	4		
1740	1 April	1	5	21 April	W.O. 55/350. p. 165.
1741	30 ,,	1	6	30 ,,	W.O. 55/351. p. 67.
1743	1 July	2	8	7 March	W.O. ,, p. 214
1744	1 Jan.	2	10	5 ,,	W.O. ,, p. 317.
,,	1 Oct.	1[2]	11	30 July	W.O. 55/352. p. 150.
					S.P. Dom.[3] Entry book 186.
1745	1 Aug.	2	13	11 Oct.	
1747	1 July	1	14	4 Sept.	W.O. 55/409. p. 44.
1748	12 Dec.		11[4]	12 Dec.	W.O. 55/408. p. 6.
1755	1 Jan.	4	15	12 Feb.	W.O. 55/411. p. 106.
,,	1 Sept.	2	17	21 Oct.	W.O. ,, p. 190.
1756	1 Jan.	2	19	17 Feb.	W.O. 55/355. p. 295.
,,	1 May	1[5]	20	21 May	W.O. 55/356. p. 57.
1757	1 Jan.	4	24[6]	8 March	W.O. ,, p. 226
1758	,,	2	26	29 ,,	W.O. 55/357. p. 150.
1759	,,	2	28	10 Jan.	W.O. 55/427. p. 9.
,,	1 Aug.	1	29	20 Aug.	W.O. 55/359. p. 198.
,,	1 Nov.	1	30[7]	26 Oct.	W.O. 55/427. p. 362.

[1] One Company of Artillery at Gibraltar, and one at Mahon (Minorca), already existing, merged into the Regiment.
[2] Company of Gentlemen Cadets.
[3] State Papers, Domestic.
[4] Three Companies reduced.
[5] Company of Miners (Converted into a Company of Artillery in 1758).
[6] Formed into 2 Battalions—12 Companies each.

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A further augmentation of 2 Companies was sanctioned in March, 1758, and at the same time the Company of Miners was "*converted*" into a Company of Artillery, "as a sufficient number of Miners can be furnished by the Regiment whenever our Service requires." If employed as Miners, Serjeants were to receive 11d, Corporals 6d, and Gunners 5d per day, respectively, as extra-duty pay.

In January, 1759, two more Companies were raised; another in August, and another in October, thereby bringing the strength of the Regiment up to 30 Companies—1 of Gentlemen Cadets and 29 of Artillery.

This Warrant authorized also the formation of three Battalions, each to consist of 10 Companies "with their necessary Field and Staff Officers."

Here it may be well to make pause and close this chapter of our early history—1716 to 1759.

During that period the Regiment had taken part in all the great military events of the times—Defence of Gibraltar, 1727; Dettingen, 1743; Fontenoy, 1745; Culloden, 1746; Capture of Louisburg, 1758; Capture of Quebec, 1759; and Minden, 1759; had seen sea-service in Bomb-Vessels in the Mediterranean in 1743-6; had sent a large detachment (with 9 officers) to India, with Admiral the Hon. Edward Boscawen's Expedition in 1747; and to India again, in 1755—4 Companies—and although the Dorsetshire Regiment (39th Foot) bears the motto *Primus in Indis*,[1] the R.A. most certainly has priority, which can be proved up to the hilt.

I have gone minutely into the details of these 'origins' and give references for every statement, because it is all-important that we have the FOUNDATIONS of our History well and truly laid.

In the so-called List of "Changes in designation" (now under revision) of the Batteries and Companies of the Regiment, first published by the R.A. Institution in 1883, the year 1705 is assigned to five units as the year of their formation—as being Companies of a "Train" of Artillery. This is an error, and not capable of proof.

The two Companies raised in 1716 were in no way connected with a "Train" which had *at any previous time* existed. They were an entirely new creation, and from them the Regiment has grown into what it is to-day—a Regiment which possesses traditions and honoured memories.

In concluding this somewhat dry-as-dust chapter, no apology is needed for stating facts, but may I express a hope that 26 May, *year after year*, shall be marked and celebrated by every Brigade, Battery, and Company of the Regiment, *throughout the world*, as *the* day on which our Regiment commenced its career.

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[1] It reached India in 1754. The same argument, *per contra*, might be used regarding one of our own Regimental mottoes—*Quo Fas et Gloria ducunt*—which is also the motto of the Queen's Own Royal West Kent Regiment (50th and 97th Foot). It was granted to that Regiment in 1826, seven years *before* it was granted to the Royal Artillery.

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Citizens of the U.S.A. celebrate 4 July—The Declaration of Independence; Scots celebrate several Anniversaries—St. Andrew's day, Robert Burns's birthday, etc.; millions of persons celebrate Religious Festivals. And surely the birthday of *our* Regiment is not unworthy of annual recognition by all "Gunners", with honourable and impressive ceremony. *Majora canamus.*

[Note. The so-called *Notes on the Early History of the Royal Regiment of Artillery*, collected by Colonel S. Cleaveland, and published by the R.A. Institution, should *never* be quoted as "authority". In a large number of cases the dates of Royal Warrants, incidents, etc., contained therein, are wrong.]

Officers of the Royal Artillery. Mauritius 1860.

Back row. Lieut. G. E. Maule (No. 2479); Captain W. J. Grimston (No. 2141); Lieut. A. H. Gorges (No. 2621).

Front row. Lieut.-Colonel W. A. Middleton, C.B., (No. 1945); Colonel C. V. Cockburn (No. 1778); Captain A. E. H. Anson (No. 2051); Surgeon E. S. Protheroe (No. 276).

The date on which this photograph was taken must be late in 1860.

The Headquarters of the 12th Brigade, R.A. were then in Mauritius.

No. 2 Battery was the only one of the Brigade at Headquarters. Grimston was Captain of it, and Maule and Gorges were subalterns in it.

Cockburn, who had been in command of the R.A. in Mauritius since 1857, was promoted to the rank of Colonel on 13 July, 1860, and Middleton, promoted to the rank of Lieut.-Colonel on the same date, being then stationed at Benares, succeeded him in command. Anson, who is still living, was Inspector-General of the Mauritius Police.

The photograph is interesting as a "fashion plate" of the period —Mess Dress, Frock-coats, and Shell jackets.

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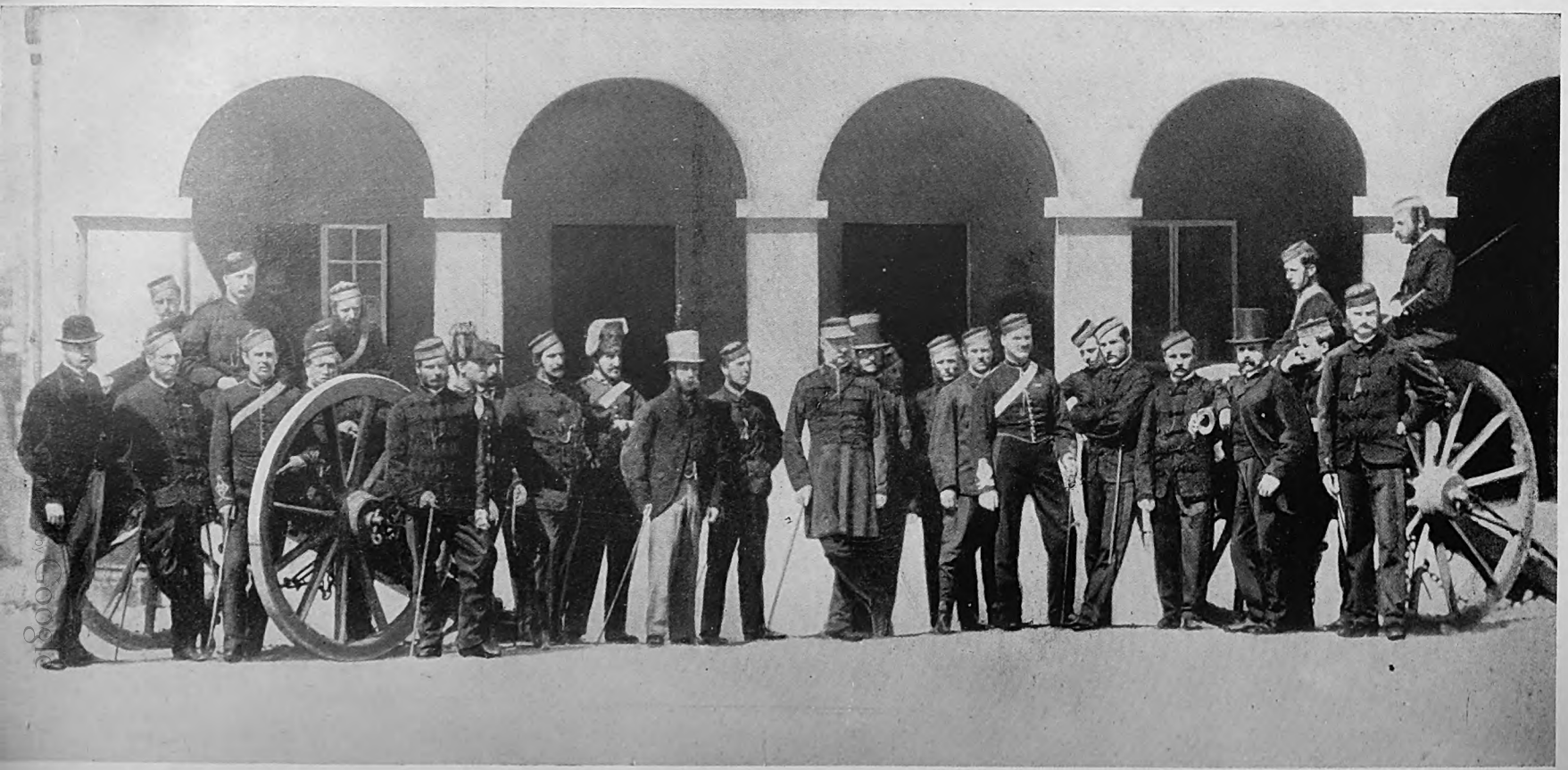
GIBRALTAR, 1866.



Names reading from left to right.—Lt. A. J. Cullen, 2nd Capt. H. A. Doyne, Lt. G. S. Parry, Lt. D'A. B. East, Lt. E. T. Warry, 2nd Capt. C. W. Walrond, 2nd Capt. P. Jackson, Lt.-Col. C. G. Arbuthnot, Lt. H. T. T. Sandes, 2nd Capt. J. Hanwell, Qr.-Mr. J. Vignaux, Capt. J. A. Price, Hon. Capt. W. P. Brisley, Lt. R. P. Hare, Col. C. J. Dalton, Surgeon-Maj. E. H. Blake, Capt. (Bt. Maj.) F. R. Glanville, Lt. R. H. Wallace, Capt. W. T. Barnett, 2nd Capt. W. Rooke, Lt. J. R. Slade, Lt. P. C. Whalley, Lt. C. G. Rule, Lt.-Col. A. Thompson, Lt. M. G. Gerard, Lt. A. R. Mainwaring, Lt. H. S. Ford, 2nd Capt. G. E. Maule

THE ROCK.

As regards its connection with the R.A.

BY MAJOR-GENERAL J. C. DALTON, COL. COMDT., R.A.

THE syllabus supplied me by the Committee of the R.A. Institution, states that the articles for the special number of the "Journal" are to take the form of "Reminiscences", and I have had the honour to be asked to write a paper on the far famed Rock of Gibraltar.

It is a large subject to do justice to in a small space; so much must be omitted which one would like to touch on, but that will, I am sure, be understood.

I can only imagine that the reason I have been invited to deal with this subject, is due to the fact that my connection with the 'Rock', if it does not go quite so far as the siege, that of my regimental ancestors nearly does, for Major-General Charles Dalton (K. 1305), served there 1819-20 and Lieut.-General C. J. Dalton (K. 1765), 1831-4 and 1861-6 whilst I am credited with 1870-1, 1883-7 and 1905-6.

It is not surprising therefore that I am not short of recollections, having spent some of the happiest years of my life there; the difficulty is how to discriminate.

I therefore propose to deal with my subject under different headings,[1] keeping "shop" severely alone, except in so far as it touches on the obsolete into which category I may well class myself with my regimental forbears!

I. HISTORICAL.

Gibraltar, the *Mons Calpe* of the ancients has been the scene of constant encounters for the right of possession since the days of the Phœnicians. In A.D. 711, the Moorish conqueror 'Tarik' secured the prize; hence the name Gibel Tarik. In 1435, Spain made an unsuccessful effort (not the first) to capture the stronghold, and it is recorded that artillery was then employed for the first time against Gibraltar.[2]

In 1704, as we all know, Admiral Sir G. Rooke surprised the fortress. The Spaniards, tho' they had a good armament of 100 guns had only an exiguous garrison and surrendered on the second day of the bombardment.

[1] For easy identification of the many R.A. Officers mentioned in this paper, I have quoted their "regimental number" in Kane's List of Officers, Royal Regiment of Artillery. (*w*) means wounded. *J.C.D.*

[2] I am indebted for this and more to the excellent summary of events given by the late Col. G. J. Gilbard in the Gibraltar Directory (1906), published by the Garrison Library. *J.C.D.*

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A desperate attempt was made that year by Spain assisted by the French with a powerful fleet to evict the usurper, but after six months fighting this, the *twelfth* siege, was raised, and we were not further molested till, in 1727, the Rock sustained its *thirteenth* siege. With a reduced garrison, untrustworthy armament, and only one company of artillery, it took the garrison all its time to beat off the attack, but on the arrival of the *Torbay* with reinforcements of two regiments and a company of artillery under Colonel Jonas Watson (K. 2), the defenders were enabled to man more guns and at the end of five months the enemy retired. Capt. T. Holman (K.8), who commanded the original company, was killed on 5 Mar. in the 'Royal' Battery.

In 1778, General Eliott (K. 39), the Governor of Gibraltar, foreseeing danger from the alliance of Spain, France and America against us, deemed the five companies of artillery insufficient and urgently asked for more. One company was allowed but did not come for over two years! War was declared, and on 11 July, 1779, the *fourteenth* siege of Gibraltar was opened by the Spaniards and French. The R.A. were commanded at first by Col. J. Godwin (66), whose health broke down, and Col. A. Tovey (92), relieved him in 1780.

One of the finest feats of the siege was the great sortie of 27 Nov. 1781, under General Ross. The artillery party of 4 officers and 110 men which accompanied it covered themselves with glory under their gallant leader Capt. Abraham Witham (414), who personally captured a Spanish officer. The enemy's batteries were destroyed by fire faggots, and the gunners spiked all the ordnance. Col. Tovey died on the day of the sortie, and was succeeded by Major George Lewis (176), who later, was wounded, having greatly distinguished himself. Drinkwater and Browne give full details of the siege. Had it not been for occasional reliefs by Rodney in 1780 and Admiral Darby in 1781, the garrison could never have held out, and it suffered the greatest privations. The climax came on 13 Sept. 1782, when the huge fleet of bomb vessels and French men-of-war were destroyed by the fire from our batteries with red-hot shot in reply to the furious joint bombardment by the enemy. Two officers of the R.A. and five men were killed, and three officers and twenty-one men wounded on that day. Negotiations soon ensued for peace which was not signed till 2 Feb. 1783, when the chivalric Duc de Crillon and General Eliott met on the neutral ground, the former being emphatic in praise of our artillery. The losses of the besiegers were immense.

In 1782, Lt. Koehler (605), invented the depression carriage which bears his name, by which means a gun could be depressed as low as 70°. Drinkwater describes it, and Koehler's drawings are preserved in the R.A. Institution. General Eliott was so pleased with this device that he took Koehler later onto his staff which ensured him a fine career, but he died of fever at Jaffa in Syria in 1800. During the latter part of the siege, Lt.-Col. Griffith Williams (131), was C.R.A., succeeding Major Lewis.

Drinkwater in his comprehensive work alluding to the great sortie of Nov. 1781, pays a strong tribute to the bravery of the Spanish

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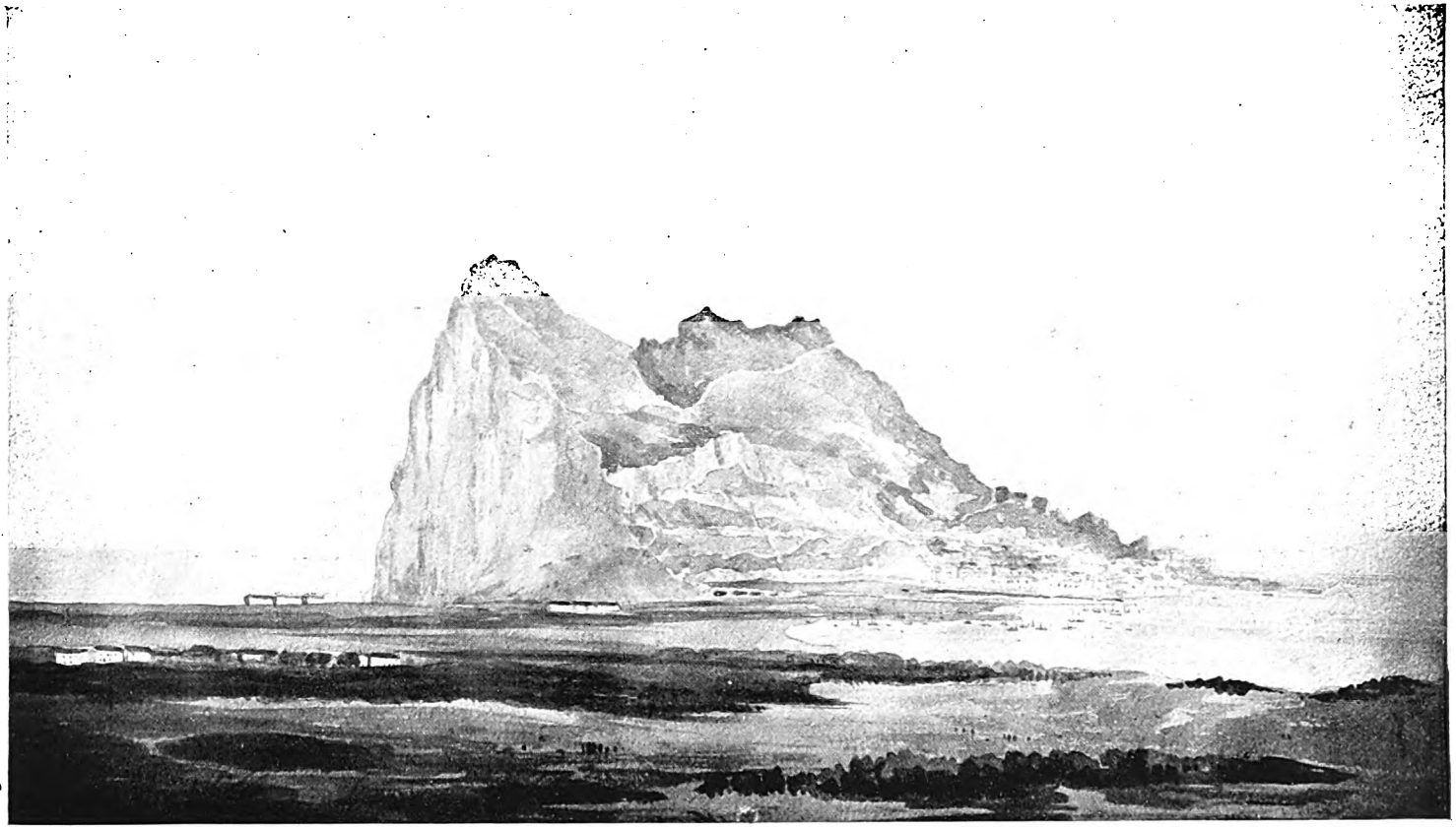

THE ROCK, date approx. 1830-34. Believed by Lieut. Powrie Ellis, R.A. (K. 1789).
Showing the present city of La Linea in the foreground.

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Copper Medal for repulse of Spaniards, 13th September, 1782. Given by C.O's to deserving soldiers.

General Eliott's Silver Medal to the Hanoverian Troops who formed part of the Defence Garrison. (The Reverse gives the names of the principal Officers.)

Large silver Commemorative Medal for the Defence of Gibraltar. (Used as a presentation Medal, 1783.)

artillery officers who stuck to their posts to the last and whose conduct was worthy of the best traditions of the artillery arm of any country. I am enabled by the courtesy of Spink & Son to give three illustrations of medals conferred for the Siege of Gibraltar.[1]

King William IV. as a Midshipman was present during part of this great siege and I can therefore more readily appreciate my father's story that when he attended the King's levée on Woolwich Common in 1834, "on return from Gibraltar," the King said to him "Been to Gibraltar, Eh? "

II. PROFESSIONAL.

My battery, 8/15, which was commanded by a fine old soldier, Bt. Lt.-Col. E. G. Bredin (2177), a well known artist of Crimean subjects, was in charge of the District which embraced the lower Rock Galleries and Lines which had been excavated and armed during the great siege and did good service.

For long, however, they have been obsolete and now—how have the mighty fallen—they are chiefly curiosities for tourists supplied with passes, and a cool resort for picnics! But in 1870-1, they were in full swing and afforded young officers infinite variety for practising 'repository work' and knowledge of magazine duties and stores.

One feature has, or had till recently, survived viz.: the 'Royal Salute', fired with black powder, starting with the 'Rock gun' and running down the gamut of the galleries to usher in the 'King's Birthday' celebration at which the Spanish Governor, staff and escort are honoured guests. The armament of 1870 was almost entirely smooth bore, the largest calibre being the 8″ 'shell gun' and included every kind of piece, guns, carronades, howitzers and the 12-pr. brass field gun. We youngsters took the greatest pride in these, our children, who had to be scrubbed and clothed with fresh coats of lacquer and paint, for which purpose we had to be constantly dismounting and mounting them, the "Gibraltar Gyn" being a favourite toy. I remember being given a difficult job (rather above my powers) which resulted in my breaking a "triangle gyn", and was of course told I should have to pay for it and suffered torments until the Court of Enquiry exonerated me in kindly terms!

And then the "artillery store" of that day! No museum was in it with it! A sight for sore eyes, with beautifully polished copper scales and weights, magazine and laboratory implements, models, "Desaguliers searchers," linstocks, portfires, slow match, tubes, fuzes, furnaces for red-hot shot, which we drilled with, &c., &c. But they were happy days, and in our own way and according to our lights, we were as efficient and up-to-date as the subaltern of to-day. Then imagine the pride of being in charge of a party of six-foot gunners in the height of the summer, all in our "stocking feet" seated on a *wadmiltilt* round a barrel of powder in a bell-tent, weighing out powder and filling cartridge cases!

[1] See "Historical Record of medals and decorations, &c.," by the late Capt. G. Tancred, Royal Scots Greys. (Spink & Son) 1891. *J.C.D.*

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But had we not as our Instructor in Gunnery one of the greatest inventors the Regiment has had, running Shrapnel, Boxer, Blakely and others close. I allude to the late Col. H. S. Watkin (3002), then a Lieut. He brought out his first idea of a Depression Range Finder in that year, consisting of a telescope, spirit level, graduated arc, &c., made with his own hands and irreverently called by us the "Watkiometer." We little realized then what it was to develop into! I remember one day conducting practice under his supervision from the Ragged Staff flank—armed in those days, but never again!—from our show gun, the 7″ R.B.L. We were firing Segment shell at a moored target out at sea, through an embrasure, and were all standing clear but near the gun, when on giving the word to fire, the shell broke up in the bore and burst the gun. Fortunately for the Regiment, and, in a minor degree, for the narrator and other small fry, the gun was only split longitudinally. Parts of the shell struck the ladies' wooden bathing shed—which lay under the line wall—and was closed for the practice, so fortunately the *houris*, who usually disported at that hour, were safe at home, and little harm was done. A few fragments hit the new Mole where the innocent blue-jacket was working, and as he and his mates hastily took cover, it seemed to my youthful sense that a warm and sulphurous breeze was suddenly wafted over from that direction. But I may have been mistaken!

An order came suddenly, in 1871, that some 9″ R.M.L. guns of 12 tons, which had been lying about for some years, were to be mounted. I had to take one up through the upper town to near Willis' Guard—about 600′—a tough job.[1] It was hard work to find holdfasts; we had 20 mules and a large working party and I made fast my cable round a small island of houses, but when the mules took the weight, two women from an upper window screamed out that their ceiling was coming down! However we muddled through.

H.E. Sir Richard Airey, and staff, rode up one day to the Rock Gun to see our battery at practice with a 32 pr. S.B. gun on a depression mounting at a flagstaff planted in the beach below. We were at +1350′. The gun having been loaded at a slight elevation with a round shot and grummet wad, wedged in tightly by means of a "wadstick", was then carefully depressed and layed on the flagstaff. The governor arrived in at the death, the flagstaff being broken at the first round. A hideous fluke, but useful!

Reminiscences swarm, but space forbids! However, one more story, suitable for the fifth of Nov. though it was not; but one day, in 1870, an unsigned letter in Spanish was found which implied that an attempt was to be made to blow up the magazines up the Rock, and that already trains had been laid to one or more! Orders were at once issued that all officers should go round every magazine in their charge and make a careful examination. We accordingly proceeded on our perilous mission but found nothing unusual.

But this was not deemed sufficient, and a ukase went forth that the subaltern on brigade duty was to turn out the guards at Willis Battery (+600) and Rock Gun (+1350) three times a week after

[1] Curiously enough the sites for these guns had been selected by my father and the C.R.E. in *1865-6*, on the Queen's Road. *J.C.D.*

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11 p.m.; also the captain of the week had to do the same once. This caused some consternation but had to be done. Most walked up, but a few who had ponies rode. The first night I had to do it was very dark, and after doing Willis' which was good going, I had to start up the shortest path for Rock Gun, taking the Bombr. of Willis' with me who went in front with a lantern. My pony did not like the lantern at first and as the path was steep and rocky, and parts of it on the side of a precipice, no more did I, but next time my pony, "Gunner", was quite amenable. The experience was hairy and we were glad when the order was rescinded!

A somewhat similar thing happened in 1885 when I was D.A.A.G. A sentry in the Sandpits found a suspicious parcel, tied up and near the magazine; it was taken into the guard room and of course found its way to my office. My chief referred it to the Inspector of warlike stores, being the man of science responsible for explosives. He, "good easy man", returned it with a report that it seemed innocuous and recommended that it should be transferred to the sea! Being a wag, he christened it "Dalton's fulminate" which caused laughter for some time, "in which the prisoner joined"!

Dress. In the sixties and seventies the summer dress for the troops was a white tunic with R.A. buttons and stand up collar. Officers wore a white linen collar and gold-twist shoulder cords but no badges of rank. The officer on duty wore the white cross belt and pouch, and sword belt under the jacket, also thin serge overalls and usual stripe. The head-dress was a straw peakless cap with a white puggaree, the end of which hung down to protect the nape of the neck, and no gloves.

As will be seen from the picture of the 1st Bde. in 1866, the uniform of that day, included the old stable or shell jacket, highly braided patrol jacket and the busby—in full dress.—All have long "passed on" including also the "lady killer" whiskers!

The officer on brigade duty was allowed to wear his white clothing at mess, as he had to turn out the guard, &c. I remember one subaltern, more of a sportsman than a dandy, who appeared one night at mess with his white jacket so untidy and crumpled (he having probably had a *siesta* in it) that the senior officer —a bachelor Lt.-Col. —sent him away and he had to have his meal elsewhere!

The Moorish Castle—the remnant of a splendid palace dating from the 8th Century, the keep of which is pitted with shot and shell holes—is now the civil prison and, in May 1886, my double duties as D.A.A.G. and Editor of the *Gibraltar Chronicle*, took me up there to witness the execution of a Spaniard for the murder of an old sapper R.E. whose house he was burgling. I thought it advisable to sleep in an empty quarter of the castle in case of any disturbance and because the sad ceremony was fixed for a very early hour. I do not propose to describe what I saw, but though everything was done in perfect order and with extreme consideration for the prisoner—who was wonderfully plucky, confessed and made a short speech ascribing his crime to drink—I am not likely to forget the scene, especially the procession to the scaffold. We were told that the prisoner had slept well: I know I had not!

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The R.E. had to get the gallows made, and as they were sure the natives would never make it knowingly, they cleverly distributed the job amongst a number of workmen and then put it all together themselves.

The hangman was a pardoned prisoner who was supplied with a mask and suit which, with other paraphernalia, was got out from London. No one recognized him and he was got safely on board an outward bound vessel the same night. Twenty-one years later when I was inspecting at Gibraltar (1907) and was being shown over the new tanks behind the Moorish castle by the R.E. foreman in charge, I happened to recall the incident and he at once produced from his pocket a photograph of the victim—old Sapper Nettleton—who had been a mate of his at the time!

III. RECREATIVE, ETC.

Few foreign stations are better off than Gibraltar for recreation, taking all things together.

(a) *The Royal Calpe Hunt.*

This old established pack of foxhounds dates from 1814, when the *Isla de Leon* Hunt, maintained by the British garrison of Cadiz, was dissolved, and the remaining members decided "that the hounds shall be offered to the officers of the 29th Regiment, who originally subscribed to them, and to the officers composing the Hunt club *now* (1814) *established* at Gibraltar.

Earlier in the century a sporting parson called Mackareth and a Mr. Relph started a civilian hunt with two hounds and had some good sport up the Rock! When the French "Army of Observation" left the vicinity, and the country outside became available, more hounds were got, the officers of the Garrison joined in and Mackareth hunted the pack. Later—perhaps 1811—Lieut. F. T. Templer, R.A. (K. 1509), and Lieut. R. C. Alderson, R.E., a contemporary of Templer, both sons of M.F.H's at home, took up the Hunt seriously and the Garrison seem to have absorbed the civilians, and the Hunt became the "Calpe" with a pink instead of a blue livery.[1] Kennels were built in the North front and the pack has flourished ever since.[2]

The country is rough and varied; hilly, rocky, cork, sugar cane brakes and pine woods, gum and whin bushes, big and deep rivers and awkward tributaries; foxes plentiful and sturdy.

The value to Gibraltar as a station, of this Hunt is incalculable, especially for the youngsters who can procure good ponies at a reasonable figure, get healthy exercise off the Rock, and cultivate a love for hunting and seeing hounds work, besides acquiring a strong seat on a horse, for they need good nerve and to sit tight!

[1] See "Gibraltar Directory".

[2] When Colonel Burgmann, R.A., was Master, and I his Secretary 1883-7, new kennels were built near the Race stand, Sir J. Adye being Governor, and Col. P. Ravenhill, C.R.E. *J.C.D.*

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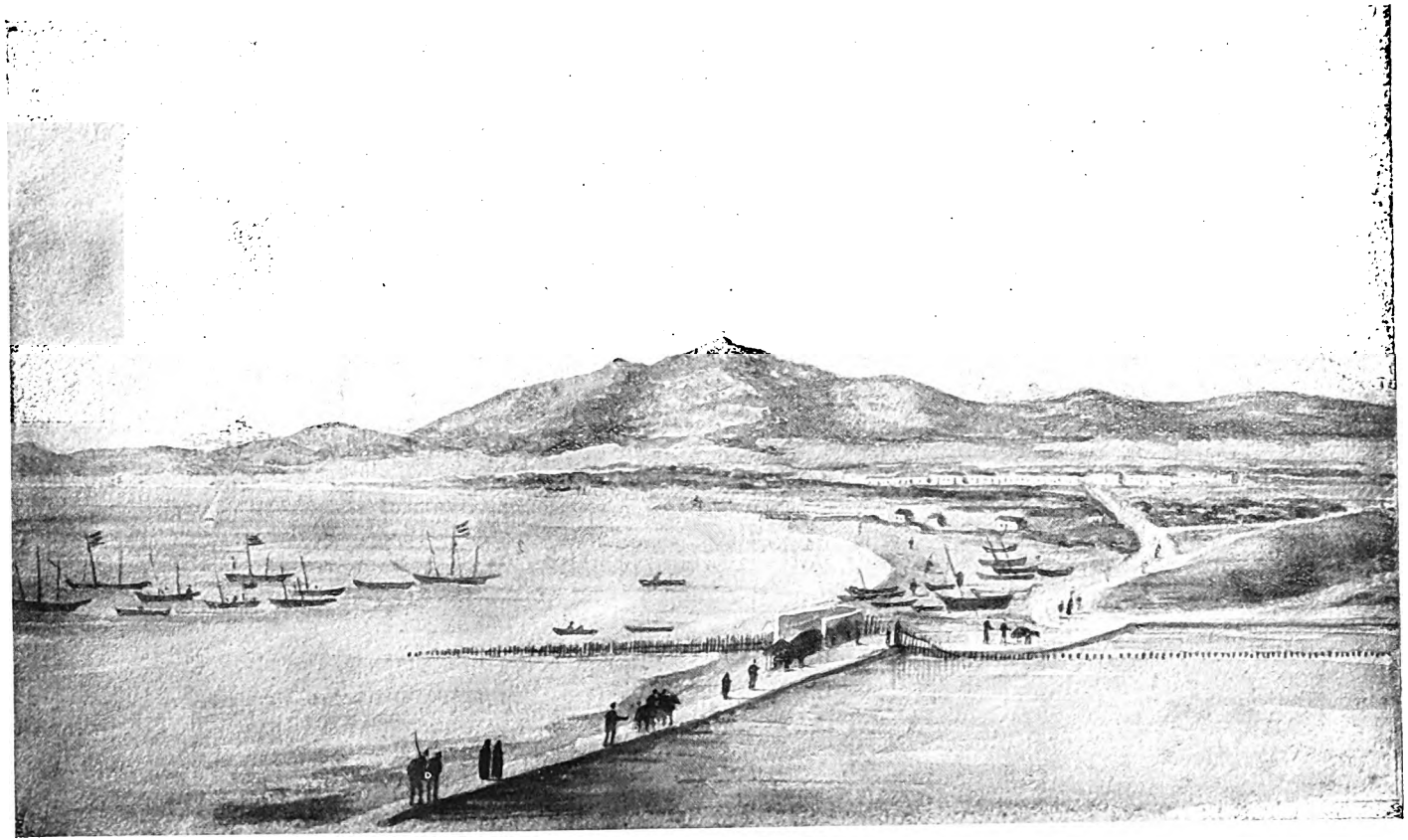

GIBRALTAR, date approx. 1830-34. Bayside, N. Front Linea, San Ropue, etc.
Believed by Lieut. Powr ie-Ellis, R.A. (K. 1789.)

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The officers of the garrison had the entire management of the hunt till 1891, when Mr. Pablo Larios (now the Marques Marzales) who had been 'first whip' for some years and is a big landowner in the neighbourhood, was elected Master and still carries the horn and hunts the pack with the help of a kennel huntsman and whip. He is a fine sportsman, alike in the hunting field, polo ground or between the flags. Owing to rabies—easily contracted in Spain—the pack had twice to be destroyed, and after the second time Mr. Larios bought a new pack which he owns, and hunts as a subscription pack with a President, committee and Hon. secretary and Field master, elected from the Garrison.

In 1906 the Kings of England and Spain honoured the hunt by becoming Patrons, entitling it to the prefix of "Royal".

In the list of "members" up to date there must be quite 300 'gunner' officers including all the C.R.A's and many well known names. Seven gunners have been Master, and thirteen, Secretaries. The first R.A. Master was Col. W. Cator (1134), in 1852, who when in the Peninsula, belonged to the *Isla de Leon* Hunt.[1] Lieut. H. E. Morritt (K. 1834) was huntsman 1838-42. After that date the huntsmen were servants till 1893. Ten R.A. Officers have been whips. Gunner John Marshal was for 17 years earth stopper and kennel man. He resigned in my time and died in 1884. A favourite covert near the 1st Pine Wood was called Marshal's bank after him. Four R.A. officers also have acted as earth stoppers.

A well known gunner, the late Col. C—— who was in the 15th Bde. with me in 1870, mounted on his pony 'Rufus' was a very hard rider with the Calpe, and being extremely short sighted it was all the more to his credit that he shirked nothing. One day the hounds were in full cry and C—— coming to what he imagined, with his blind eyes, to be a nice little obstacle or clump of bushes, rammed Rufus at it—his right arm and crop uplifted, "rejoicing" as I think Jorrocks calls it—when he suddenly found himself at the bottom of a small ravine in which some young trees were growing and of which the *tops* constituted his fence! His crop remained in the trees but he and Rufus scrambled out, recovered it and neither "one penny the worse"!

However, the schooling he had in that country of crags and precipices stood him in good stead, nine years later, when retiring with his section from the bloody field of Isandhlwana. After his guns had stuck in a donga and the horses and men had been assegaied, he rode down the precipitous bank to the river Buffalo with one sergeant, the only survivors of the section, swam the river and got to Helpmakaar in safety.

In 1870, we had a very sporting regiment, the 83rd., in the Casemates Barracks, and one of their subalterns (later a noble Lord and V.C.) collected a 'bobbery' pack of terriers—to which I contributed two—for the purpose of drawing the coverts formed

[1] When hon. secretary, I had charge of a small book which came into the possession of the Calpe Hunt when it took over the Cadiz pack. *J.C.D.*

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by the wreckage and other rubbish and refuse accumulated in the ditch of the fortress (now part of the market), behind the officers quarters, for the—more or less—wild cats, who made night hideous on the Rock. We had some good runs—on foot of course—through the main ditch.

However, the quarry became scarce and the M.F.H. of the 'Calpe' who loved any kind of sport, thought he might help us by buying some cats cheap at the village of Campo, along the western beach, to turn down. So he started off, provided with a sack, on his old hunter "Paganini". He found the inhabitants only too ready to oblige him with cats of various sexes at a *dozie* (3d.) apiece, and having procured several and put them in his bag he attached it to his saddle, whether fore or aft, I cannot say, and started on his short ride home. At first all went well, but anxious to get back with his odoriferous burden, he urged his steed into a gentle canter. This had an effect he had not bargained for. The prisoners got lively and combative, clawed old "Pag" through the bag, who resented, in a succession of bucks, and the rider, who had I fancy been touched up himself, only managed to keep his seat by cutting his load clear, thankful to get home safely, though minus his purchase!

In later days one very important duty of the Secretary of the Hunt, was to ride into Spain with the Arbitrator, a Spaniard, to settle the exorbitant charges made by farmers for our riding over cultivation, and I had long journeys for this purpose. Col. Burgmann, when on leave in the summer, brought out some good sized cigar cases of pigskin with a fox's head stamped on them and we made presents of them to the leading farmers over whose land we hunted. They were proud of the gift which salved their rapacious demands. One *hidalgo* wanted to charge for each hoof mark!

Gibraltar is well off for churches and chapels of all persuasions, good clubs open to military and civilians and fine up-to-date hospitals for the Services and Colonial purposes.

There is good enough shooting to be got both in Spain and in Barbary and attractive Fairs in Algeciras and the neighouring towns all of which have bull-rings, to which good *cuadrillas* come in fairtime. Charming rides on horseback and railway and steamboat excursions can be made. The hotels at Ronda, Algeciras, &c., are modern and up-to-date—also at Tangier.

When visiting Tangier late in 1883, I found an ex-master gunner R.A., who was in charge of the artillery of the Sultan of Morocco; he showed me round the coast defences which, with Moorish gunners, he had armed with 10″ 20-ton guns which—with their mountings, he had man-handled through the city—a fine piece of work!

(b) *Racing.* There is the 'Gibraltar Jockey club' and Civilian clubs. Many R.A. officers have distinguished themselves on the Turf in Gib, amongst whom may be mentioned "Boots"

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Wallace, "Tim" Reeves, "The Treasure" Dalbiac, Jack Hanwell, John Adye, C. S. Taylor, J. A. Labalmondière and others. The *Pari-Mutuel* and selling lotteries obtain here, and answer well. H.M. Queen Alexandra when she visited Gibraltar in 1905, attended the meeting of the Civilian club and presented a handsome cup which was won by Major Labalmondière with Capt. Taylor up.

There are a *Polo Ground* and *Golf Course* at Campo besides a Race course. Gymkhana and cricket take place on the N. Front and boating, bathing, racquet court, musical societies, &c., on the Rock; also a *Theatre Royal* for Spanish companies and amateurs where in Carnival time a succession of masked balls take place.

(c) *The Assembly Rooms*, built in 1884-5 on the old R.A. Repository ground in the Alameda, with ball-room, stage, restaurant, &c., are much in request. The *Garrison Recreation Rooms* started by Sir John Adye, who did so much for Gibraltar during his three years of Govt. 1883-6, cater for the *personnel* of the services. For a long time Major T. F. Cooper, R.A., was the chief prop of this successful institute.

(d) *The Garrison Library* dating from 1804, is quite the most important establishment on the Rock; and now managed by a committee is a legal corporation with a secretary who acts as librarian (Lt.-Col. James), who also is the editor of the *Gibraltar Chronicle*, with Mr. W. Miles as manager of the printing dept. The *Chronicle* is the official gazette and was for many years edited by officers of the garrison of whom six have been R.A. officers. Two G.O.C's. R.A., were also Presidents of the Library Committee. The Library acts both as library and social club.

IV. GOVERNORS, C.R.A's AND R.A. MESSES.

(a) The following distinguished Gunners have held the appointment of Governor of Gibraltar :—

1. General Sir G. A. Eliott (K. 39), 1776-84; he started life as a 'cadet gunner' in 1739, and after 14 months as Lieut. R.A., passed on to the R.E. and cavalry.
2. Genl. Sir John Smith (458), as C.R.A. 1804, and Governor 1814.
3. Genl. Sir Robert Gardiner (979), 1848-55.
4. Genl. Sir W. F. Williams, Bt. of Kars (1726), 1870-5.
   He started and opened the Sailors Home in 1872. I remember that he was very good to us gunners and did not forget the youngsters. He was fond of small unofficial dinners in plain clothes at a round table at which he presided, in a dress coat and brass buttons, the honours being done by Mrs. de Winton, wife of his military secretary. His great friend and ally was his contemporary Genl. Sir John Dupuis (K. 1714). They entered the Shop together, getting their commissions as Lieuts.

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in the same month, though the latter was four months older and six months senior as 2nd Lt. They ran a neck and neck race all through the ranks to General, but Sir Fenwick passed him as major by an earlier brevet and became the senior. After they left the service these old bachelors travelled in most winters to the Riviera, where they were great favourites and adored by the ladies! Sir John's health failed first and his memory got shaky. One of the last times they met in the 'Senior' he mistook his old friend for someone else, and after shaking hands warmly with him said "seen Williams lately, I always thought his services were over-rated!" My informant gave me to understand that Sir Fenwick told him the story. Both had done fine service, but Dupuis had more actual campaigns —Sir Fenwick's work was all in Turkey. The latter survived his friend 7 years and died aged 83 in 1883. In one's old age, nature is apt to play sad tricks and may lead us into a "Palace of truth"!

5. General Sir John Adye (1891), 1883-6; who greatly improved the communications of Gibraltar, installed condensing plant in Southport ditch which did grand service during the cholera visitation of 1885, was a clever artist and made many drawings of Gibraltar and vicinity.
6. General Sir Robert Biddulph (2365), 1893-1900, who reformed the finances of the colony and substituted the currency of the U.K. for that of Spain, improved the water supply and drainage and advanced the dockyard works and commercial port.

(b) *C.R.A's.* There is in the R.A. H.Q. office a list of the officers commanding the R.A. in Gibraltar from 1726 up to date. They have varied in rank from captain to major-general. the present holder of this post being the 49th and a colonel. This list was carefully compiled by the late Lieut.-Genl. F. G. Slade in 1902. I remember when I took over in 1905 being much impressed by this list of such distinguished predecessors, whose services are noted after their names. The second name is Lt.-Col. Jonas Watson (K. 2), whose life of fighting began at the siege of Mainz in 1691, and he served through all Marlbro's campaigns up to 1712, arriving out in Gibraltar in the nick of time in 1727, with reinforcements, which soon decided the course of events. In 1741, he left Woolwich to go out to the Spanish main in command of the R.A. of the expedition against Cartagena and died nobly in action at the age of 77!

There has been in the charge of every C.R.A. since 1863, a "confidential" note-book compiled, by order of the then C.R.A., Colonel C. J. Dalton (1365), by Lieut. C. G. Rule (2863), which contains plans and armament of all the R.A. barracks and batteries on the Rock at that date. It has long 'ere this passed into the category of an antique!

(c) The H.Q. Mess is the *R.A. Mess (North)* on Governor's parade. but there is another very good mess for the R.A. South, at Bleak house, Europa.

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The H.Q. Mess possesses amongst other property :—

(i). An oil painting of H.E. Genl. Sir R. Gardiner, 1849-55. This distinguished gunner, who was deeply religious as well as a fine soldier, bequeathed in 1864 "to the officer commanding the R.A. in the Fortress of Gibraltar" a book which he had specially written "for the officers and men of Her Majesty's army and navy" entitled "The Sacrament of the Holy Communion or Lord's Supper" &c. (Rivington, London, 1864) and in that year it duly reached Colonel Dalton , then C.R.A., who in 1866 passed it on to his successor, and as every C.R.A. since has taken it over, it consequently bears many interesting autographs.

(ii). A picture of *the Calpe Hunt* in 1847, presented to the Mess by Lady Slade "in memory of her husband and brother-in-law . . . . Genl. Sir J. R. Slade, K.C.B., 1869 and Genl. F. G. Slade, C.B., 1899".

(iii). An enlarged group of the Officers 1st Bde., R.A., 1866.

(iv). R.A. Officers present at the *Sortie, 27th Nov., 1781* :— Capt. Abraham Witham (*w*) (414) and Lieut. William Cuppage (*w*) (459); Thomas Seward (*w*) (463) and George Glasgow (498).

(v). *Boat Race Cup* presented by Channel squadron, 1892, for Officers of the Garrison of Gibraltar, won by R.A. crew :— B. Vincent (bow) (4977), A. M. Cayley (4658), C. C. van Straubenzee (4509), S. F. Metcalfe (4799), F. C. Poole (st.) (4723), W. B. Fletcher (cox) (3472); a distinguished crew in every sense of the word!

(vi). "Dalton" Silver cup; Calpe Hunt "Point-to-Point Race; to record the name of the R.A. officer finishing best (eight names, last recorded being 1914).

(vii). (viii). Two small *silver salvers*, dated 1815.

(ix). (x). *Two Silver snuffboxes.* (*a*) "Presented to the Officers Mess 3/12 R.A., by Lieut. Carlile Greer on leaving the battery, May, 1868" (killed in Zululand, 1879). (*b*) "Gift from Lt.-Col. Ramsay, 1809." (This must I think be George Ramsay (K. 633), who served in Gib. 1785-91, and again there and Cadiz, 1805-11).

(xiii). (xi). (xii). Three very spirited sketches in sepia by the late Maj.-Genl. J. B. Richardson who was M.F.H., 1870-2, and G.O.C., R.A., 1894-9.

On the reduction of the appointment of G.O.C. Infantry Bde., the then G.O.C., R.A., Maj.-Genl. Nixon, moved from Artillery house to Line Wall house. The former was the time-honoured quarter for the C.R.A.

The present C.R.A., Gibraltar, Col. J. D. Sherer, C.M.G., D.S.O., who has kindly furnished me with much useful information, informs

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me that the R.A. fully keep up their reputation in the field of sport, and have held the Cricket cup for the last two years. In 1922 there was formed a R.A. Literary society.

V. MISCELLANEOUS.

From 1842 to 1876 there was a *Convict establishment* at Gibraltar, at the south, for work in quarrying, &c., under the Naval department. The officer in charge 1870-2, was Capt. Campbell Hardy (2255), a noted sportsman, naturalist and accomplished artist. He died an Hon. M.G., aged 87.

The Monkeys or tail-less Apes, which have probably as a race inhabited the Rock since it was joined on to the Barbary coast, still flourish or did in 1910. At one time they nearly died out and were dominated by an effete old tyrant called 'Ferguson,' the terror of the few remaining males, and consequently highly unpopular with the ladies of the tribe, who at last combined 'to do him in,' and then hurled his corpse over the cliff! His skull is, or was, preserved in the Garrison Library.

The well known Sergt Brown, R.A., for many years a valued servant of the colony as Signal Master, at the upper Signal Station, saw a great deal of the monkeys and related how once, when his wife had left her baby asleep in its cot, in the back yard for a few minutes, she was horrified on returning to see a big monkey gazing intently at the child, having raised the cloth which covered its face. On seeing the mother it quietly lobbed away, evidently in a "brown study".

It is sad to record that under the "axe" the Upper signal station has had its last visit from the "aborigines", because on April 30, 1922, it closed its useful and historical existence, and it and the "time guns" became an honoured memory. Ichabod!

In 1870, we had a light four-oared inrigged boat fairly staunch, in which we used to row out in fine weather to the mouths of the first and second rivers, and having a permit to land on the western beach we were able to go ashore and picnic or bathe.

One day in that year when the combined Channel and Mediterranean fleets were anchored in the harbour, I was one of a crew which rowed out to see H.M.S. *Captain*, then a new departure in naval architecture. Her free-board was practically awash and we had no difficulty in getting on board. Capt. Burgoyne, V.C., who was in command, had with him his nephew, Gent. Cadet Cecil Walker, who had been at the Shop with me, but had been rusticated for some breach of discipline, and his uncle was taking him on the trip till he could rejoin! Not long after when I was up the Rock on duty I saw the entire fleet steam majestically out to sea. It was the last voyage for three of them, the *Captain*, *Psyche* and *Trinculo*! It was not long after this, I think, that I saw the *Agincourt* go on the 'Pearl rock', and when quartered in Devonport in the following year I saw her in dry-dock there and examined the enormous rent made by the rock.

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In Dec. 1883, H.M.S. *Euphrates* went ashore in Tarifa bay and I was ordered by the Governor, Sir J. Adye, to go over to Algeciras and get authority from the Spanish general to make arrangements for landing, encamping and supplying the 1,800 military and families in case she did not get off! I met with the greatest courtesy, and the General sent his A.-D.-C. with me and we travelled by road through the night to Tarifa. The senior Naval officer, now Admiral Hon. Sir E. Fremantle, had early left Gibraltar taking all the available tugs with him and, happily, they succeeded in getting the huge vessel off early the following morning, she having run into a sandy place and not damaged. I therefore found myself *planté là*, and after a miserable journey back to Algeciras found that my horse that I had sent round by the beach had got mixed up with some of the ten, or so, wrecks which had been cast on to the coast by the violent storm of the day previous, and badly lamed.

The 28th Foot were in Gibraltar in 1870, and I used to watch Lieut. Marshman perched on a scaffolding executing those two spirited frescoes which adorn the "Convent" cloisters, representing the Storming of Badajoz and the Sortie from Gib. of Nov., 1781. He was a talented artist.

December 6, 1870, was noted as the coldest day within memory, with snow and frost, and on the 22nd there took place the great total eclipse of the sun. The crowd of *savants* who came out from various places to see it, went up the Rock with their instruments, but a heavy Levanter entirely obscured the sun, though we at Europa had a splendid view through smoked glass and made successful observations —such is the irony of fate!

On 13 Feb. 1871, I had the proud but sad duty of parading 8/15 R.A., for disbandment, marching the men round to the barracks of the other batteries to which they were transferred. Lt.-Col. Lukin, Capt. Izod, Lt. Curling and myself, were then transferred home to help to form two of the new Field Batteries created in that year. In June, 1885, Asiatic cholera appeared in Spain, which put on a *cordon* to keep us out of their country, and we were the gainers, for whereas the mortality was very high in Spain, we only had 34 cases and 23 deaths, one of the latter being, alas! that of Major D. M. Waterfield, R.A. (3249), who died on 13 Oct. Under Providence we were saved by the wise forethought of H.E. Sir John Adye, in having installed a condensing plant, by which means he closed all the wells and supplied pure water at a nominal charge—also instituted soup kitchens, &c.

Colonial Secretaries of Gibraltar.

To my knowledge three Gunners have held this important post viz :—

Hon. Maj.-Genl. Sir Sanford Freeling (2138), 1859.
Capt. Sir Henry M. Jackson (3327), 1894—1901. Later, Govr. of Trinidad.
Major C. W. J. Orr (4754), 1919 to date.

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The last named was largely concerned in the negotiations leading to the great privilege conferred on the colony of Gibraltar by His Majesty King George V., in granting it a Constitution and Executive council which was gazetted on Oct. 25, 1923.

In 1886, the great traveller, Sir Richard Burton, stayed a few days in Gibraltar as the guest of Lt.-Col. C. F. Buckle, R.A., and was a good deal in the mess. When riding into Spain one day, he came across a body of Spanish gipsies, and greatly surprised and pleased them by conversing with them in the Romany dialect. He was said to be master of thirty languages and dialects!

In 1885, Zebehr Pasha was sent to Gib. to be interned with his wife and two sons. He was accommodated in Governor's cottage, in charge of an officer and a guard. In 1895, I was invited to meet him in Cairo; he seemed genuinely pleased to see me again, and only by diplomacy did I avoid an osculatory embrace, but we had a nice talk about Gibraltar where he was very happy, thanks to the great kindness of the Governor and Lady Adye.[1]

During the 'Great war,' Gibraltar though not actually attacked, was nevertheless of immense value to the Allies and especially to our Navy and that of the United States. It conclusively proved itself the key to the Mediterranean and those people who still harp on exchanging it for Ceuta are "talking through their hats". Moreover our relations have been, and are, particularly happy with the great Spanish nation, and long may they so remain!

Two stories of 'Artillery house' come to my mind—the first concerns my father, who, when C.R.A., invited as chief guest to a dinner-party the old French consul—a genial *bon vivant* and great friend. When the final *bonne bouche* was placed on the table and being discussed, my parent with true hospitality rallied his guest on not doing justice to the dish and pressed him to take another helping, his reply was "*Mais non, mon Colonel, je vous assure, j'ai bien diné, j'ai bien bu, j'ai l'estomac rigide*", at the same caressing gently the much tried but valiant organ!

The old house has witnessed some weird doings in its time, but I do not recollect a more remarkable affair than happened during the reign of my cousin Col. Kelly Holdsworth, in 1887. He and his wife had issued invitations for a grand ball at the Assembly rooms, which was to be honoured by H.R.H. the Duke of Clarence, who had arrived in Gibraltar for duty, and great preparations were being made. I had lately left for Ireland on transfer and, anxious to help, I had arranged with Grove of Bond street to send out a whole salmon as a surprise, under the special charge of the captain of the P. & O. due on the morning of the ball. The eventful day arrived and the finishing touches were being put to the splendid supper when about 10 a.m., the native butler Francisco, rushed into the presence of Mrs. Holdsworth in great excitement and jerked out "Oh, Madam, ze cook she is dronk and throw ze beautiful supper in ze sink." It was a fact. The poor hostess, writing later to me, said "that she was so stunned after seeing

[1] In September, 1922, another Egyptian hero, but of a very different type, Zaghlul Pasha came to Gib. to be interned, and was put up at Glenrocky. He returned to Egypt the following year and is now, January, 1924, practically Dictator! *J.C.D.*

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with her own eyes the wreck of the supper that she sat down and wept'' : but being a woman of pluck and resource, she speedily summoned her husband and after a satisfactory flow of language which revived and consoled them, at once started to remedy the catastrophe, made known to friends what had happened, and they all rallied round her, contributing the usual items which constitute a ball supper and assisted by Montegriffo and other pastry cooks, produced quite a good substitute; and to the great joy of the injured hostess the salmon arrived in the nick of time and constituted the *pièce de résistance*, a rare delicacy in Gibraltar. The ball was a brilliant success and all lived happy ever after!

I feel I must apologize for the length of this paper and also crave indulgence for the too frequent use of the first personal pronoun, but does not the very word ''reminiscence'' necessarily imply it? I can only ''throw myself on the mercy of the court'' and hope for the best!

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REMINISCENCES OF 40 YEARS OF PEACE AND WAR.

By MAJOR-GENERAL R. BANNATINE-ALLASON, C.B., C.M.G.

IT is difficult, if not impossible, to put one's experiences on paper without the frequent use of the personal pronoun, and one must be absolved from egoism if "I" appears pretty often. And, in mentioning names of participators in these little tales, I trust my old friends will bear me no ill-will, for I am only, at the request of the Committee, recalling some pleasant memories, and, incidentally, filling up some blank pages of the Journal.

I think most of us have had about the same experiences at "The Shop," and the only interesting remarks I have to make about our time are, that we had as a fellow Cadet the late Prince Imperial of France (who came to an untimely end when fighting for us in South Africa), and that we had four "internationals" in the football fifteen. The little Prince tried hard to play our games, and at football, which we tried to teach him, he quite understood the object was to get the ball over the goal. But either goal appeared to him suitable, and when he obtained possession, he generally went for his own goal, especially when it was the nearest!

My first connection with the "Horse Artillery" came from association and friendship with the then Captain West of the Depot R.H.A. He went by the name of Hengler, and I was duly elected, with about a dozen other Subalterns, a member of "Hengler's Circus." The object of this institution was to educate ourselves in all feats of horsemanship, tricks of the "ring," and skill at arms, and, of course, training our animals formed an important part of the performance. Roughly and shortly, we paraded on "The Common" about 5 a.m. on summer mornings, and this early hour was chosen as the Asst. Adjt. General was an early bird, and we were not quite assured of his approval of our antics.

Tent-pegging, tilting with both sword and lance, picking up articles from the ground at full gallop, jumping on and off our horses was the beginning of the course. Then, taking a circle of about fifty yards diameter, at intervals were placed a sword point in the ground, a suspended lemon (or potato), a thrusting ball on the ground, then a lance point in the ground, a tent peg, a suspended ring. Taking the weapons out of the ground at a gallop, we used them against the objects which remained.

Polo was played sometimes with the brothers Peat, then the best known players, who came over from Blackheath. The séances generally ended by "throwing" all our mounts. Tent-pegging by

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sections was varied by two sections passing one another from opposite sides, eight pegs being lined. This was rather a dangerous game, and I remember poor old Bailward, who was riding rather a hot-headed grey (for he was in the grey battery of the 24th Brigade), dropping his lance and disappearing behind the Herbert Hospital. Other variations, which were kept rather secret, were, trying to hit the "early crow" with a stick, at full gallop (Hengler had heard of this being done in India), and throwing cows by catching the uplifted tails. The only animals available were the General's cows, who had the monopoly of the common, and the exercise came to be known as "tailing the General's cow." It was rumoured that milking propensities deteriorated! But all these practices were useful, and to me particularly, as I shall show.

About this time I was doing "whipper-in" to the Drag, and an extraordinary piece of bad luck befel a soldier of which I was a witness. Rich, "Riding Troop," and I were walking a line at Sevenoaks, and of course had the two runners with us. Our work being over we went to have tea at the village "pub." A baker's man entered with the usual basket over his shoulder, when I heard Rich exclaim, "Why, Gunner Hodges!" This was a deserter from "The Troop," the only one I ever heard of. It was arranged that the man should hand over his book, money, etc., to the barmaid, which having been done, something, the Devil perhaps, prompted the poor chap to make a bolt for it, which he did. In a moment, by Rich's order, the two runners were uncloaked, and after him, with the threat of arrest if they failed. With these highly-trained sleuth-hounds after him, poor Hodges hadn't a dog's chance, and we took him back to Woolwich. He would have left Rich and me standing still.

In Afghanistan, for my battery went to India in 1878, we had, in our spare time, a good deal of fun. My first experience was taking up a draft of about a hundred horses to Kandahar. We had about twenty gunners, and upwards of a hundred so-called syces. They were described as drivers. We soon found out they were Punjabi camel drivers! It was only after marching about 200 miles that they found out that the horses were not led by the nose. Major Warter, who was in command, and was going up to command A/B R.H.A. (as it was then), was a great sportsman, and used to send me out with his gun to shoot chikor and black partridge "for the pot," and occasionally, for the jungle north of Jacobabad was full of game, we tried our hand at pigsticking with our swords. The "swine," however, always won.

At Kandahar, where we remained in sort of cantonments, for fifteen months, I was attached at first to A/B R.H.A., but then to G/4 R.F.A., whose Captain was P. K. Beaver. There was a large force there under Sir Donald Stewart, afterwards C.-in-C., and to pass the time between various warlike expeditions, we played every game—cricket, rugby football, polo, paper-chasing, gymkhanas and, sometimes, poker! Not long after New Year's Day, 1879, we had a big gymkhana or sports meeting, and among other things open tent-pegging. As there were three native Cavalry regiments the com-

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petition was keen. Well, I won it by some accident or other, but the sequel is instructive. There was a vacancy for Adjutant shortly after, and when the Lieut.-Colonel (Le Mesurier) was asked to nominate an officer, he said, "I'll have that subaltern who beat all the cavalry at tent-pegging," and he didn't even know my name! So Hengler's Circus was beginning to bear fruit, and it shows how little things that one takes in one's stride, as it were, may affect one's service.

During 1879 we used to make excursions, by some called expeditions, in various directions. On one of these occasions we went north of Khalat-i-Ghilzai, to look up some enemy's people who were troublesome. Beaver and I were always looking out for polo ponies with a bit of pace, for we had frequent racing gymkhanas. There was a good deal of "pack" transport, and, at one time during that war, India was pretty well denuded of useful ponies. Anyway, at Khalat-i-Ghilzai, we had a friendly transport officer, and one day we proposed looking over his ponies. That having been accomplished, we then proposed trying about a dozen of the best looking. The transport officer was more than agreeable, and said, "If there's anything you fancy, I'll exchange both your ponies, as I only have to keep up numbers." The luxury of descriptive rolls was unknown then. The result was that Beaver and I marched off with two useful animals, he having the best, and I the second-best in a three-furlong spin. The Transport officer was to have 50 rupees on when we had a good thing! Well, Beaver's animal came on, and soon won a race or two, but I found my beast (such a three-cornered looking animal that we called it "Triangle") could just get $\frac{1}{4}$-mile. I had to wait months before I got a $\frac{1}{4}$-mile race for maiden polo ponies. There were several opposition stables, and things were made easy by the jeers and chaff when poor old Triangle was sold in the lotteries. In the race Beaver happened to be starter. I don't suppose for one moment he favoured his subaltern, but I caught his eye at the start, and Triangle caught the Judge's at the other end, by a head. The other fellows didn't laugh any more at Triangle.

A poor fellow, a great friend of ours, died of cholera at Kandahar, and his horses (as usual in these cases), being sold by auction, I went to buy one, a chestnut, as I was short of a charger. I found Pasha Eustace there, who also wanted the horse, and as he asked me, I didn't bid against him. He got the chestnut, and when the other was put up I bid casually, and it was knocked down to me for 150 rupees. Beaver came up late meaning to buy the one I got, and when I told him he said "Well, you've got the second best "country bred" in India." And I had some fun with Vivian, really a stud-bred, and very nearly thoroughbred.

On the way from Kandahar to Kabul, April, 1880, the only "shikar" was hunting for forage, which the crafty Afghan had buried in or near the villages. But with the aid of "pathan" sowars, who were fairly adept at the game themselves, we made quite good bags. Then we fought Ahmed Khal, quite an exciting experience, as some thousands of swordsmen charged the main body as it was deploying.

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A/B had gone on with the cavalry, and coming into action, distributed shrapnel quite generously, and no doubt gave the infantry a little time to extend. But I was sent to order the horse artillery to withdraw about 100 yards, which would give the infantry a more extended field of fire. I delivered the message to Major Warter, who was in process of getting out a cheroot, and received the reply, "All right, my boy, when I've lit my cigar." At that time there was some of the enemy about 50 yards off. I had, unfortunately not supplied myself with an assistant galloper, for I was the only adjutant, and having really too much to do, my horse got beat, and, as horses often do in that state, lashed out at everyone. So I found myself cursed by everyone, and had the distinction of kicking the Chief of the Staff on the foot, and the Chief Political Officer on a very rotund thigh!

After the Kandahar Force had joined with the Kabul people, our lot was to remain in the Logar Valley, some twenty miles from Kabul. There we spent nearly three months with very little to do, and the only interesting event I can remember was a scrap the cavalry had with some tribesmen. It was fixed in my memory by the fact of the crack swordsman of Indian Cavalry meeting his match. And it happened thus: Seymour Barrow, who was brigade major of cavalry, took on a couple of dismounted Afghans. The first thing they did, however, was to cut his reins, a very useful preliminary to the defeat of a mounted man, and before assistance arrived, slashed him pretty severely on the arms. That, I suppose, is why some regiments use additional chain reins, or convertible collar-chains.

At Kabul a race meeting was got up, and some of us went in for it. I took Vivian, who from want of suitable ground could not be got fit, and, in fact, had not done more than long slow work. I had to meet a mare called Eva, supposed to be the best country-bred, and who had won the Dilkusha Stakes at Lucknow. Eva was a strong favourite, tho' a rather longer race than a mile would have suited her better. The races were held on beautiful turf on one side of the Sherpur Lake, and the one gallop I gave Vivian he simply revelled in the going. In the race, however, I could not steady him (he took hold a bit always in a race) I myself not being very fit as I had been laid up with a broken leg. Quite close to the winning post, he seemed to falter a bit, I fancy having taken too much out of himself, and Webb of the 3rd Cavalry beat me by a head on Eva. I think Vivian would have won with a better jockey, I also would have won about 2,000 rupees!

After the Afghan War most of us went back to India to join our proper units, and I went to Cawnpore where my battery then was, under orders for Peshawar. As, however, I was just appointed to the Riding Troop, I did not go north but remained at Cawnpore, awaiting a trooper, doing some pigsticking, and making excursions, as I had seen very little of India.

The horse Vivian turned out a wonderful pig-sticker. He rode like a pony, and followed the pig almost without guiding. He never

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lost first spear till his final run, when I was run into by someone from another party, and the good horse cut himself so badly that he had to be destroyed. The head of one of his finest victims, a 40-inch boar, adorned the entrance of the Woolwich Mess for many years.

A few "tales of the Tanyard" come to mind, and it may be news to many that the Royal Military Tournament owes its existence a good deal, to the Riding Troop. Under the title of "The Military Tournament," it was started in 1880 at the Agricultural Hall, by Colonel Burnaby of the Guards, and Lieut.-Colonel Honble. Alex Stewart, then Superintendent of the Troop. The late Duke of Cambridge encouraged the enterprise, the object being solely to encourage and improve "skill-at-arms." The proceeds, if any, were to go to the "Cambridge Fund, or Hospital for Soldiers." The whole of the arrangements, fatigues, etc., were carried out by the Riding Troop and Life Guards, and we, as subalterns, spent many days and nights in Islington on duty. Our sergeant-major Butler was in charge of the competitors and grooms, and our Riding Master, Dann, had charge of the arena, a position he occupied for many years, and attained sufficient notoriety to be caricatured in Punch. When the Tournament became an assured success, it was taken over officially, and in my opinion has deteriorated ever since, but the credit of its initiation is entirely due to the two officers I have mentioned, with the loyal assistance of such men as Lord Methuen, Lord Errol (Blues), Byng (Life Guards), Lord Petersham, afterwards Earl of Harrington, a keen Yeomanry officer, and several enthusiastic volunteers.

I found myself once more associated with "Hengler" West, and our early training in "The Circus" again came to our assistance, for between us we "scooped in" most of the prizes for two years. It was entirely owing to the trouble we took in the training of our horses that we were able to do this, for we met many more accomplished wielders of the sword and the lance. Two rather amusing experiences came my way during this time. I had trained a very nice and well-bred mare called Seamstress for mounted combats and could ride her without reins, using only my legs to keep her on the circle. She was undoubtedly the handiest animal in the show, and many people came to ask where I got her. They wouldn't believe she was only a troop horse!

One day, Sergeant Major Butler came and told me a gentleman was very anxious for an introduction, not a very difficult operation. He was very complimentary, especially as regards the mare, and finally asked what I would take for her, as he wanted his son to learn to do "monkey-tricks" on horse-back. The devil prompted me to pull his leg, and I deferred any answer, but he said, "at any time you want to get rid of your animal I should be glad to give you £100." Next day he appeared again, keener than ever, and said, "when the tournament is over I will give you £150, and here it is," producing his cheque book. I then had to explain that we were not allowed to sell, but would let him know if the mare were for sale.

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Then one year, a friend of mine, Masters, of the Central India Horse was home on leave, and being a keen swordsman, entered for the competitions. He came down and practised with us, and we lent him horses. The outcome of these practices was that we decided to use the lance with both hands, but to do this, one's horse has to be pretty handy. In my first competition with that article I dropped my reins, and easily poked my adversary in the ribs with the advantage of at least 3 feet in weapons. There was consternation among the judges and especially among the cavalry competitors, but there was no rule, or condition, as to holding the lance, so the competition went on and Masters won it. But the result was that a rule was introduced that "the lance must be held with the hand through the sling." But it is obvious to me that when you are fighting for your life, you naturally hold your weapon in the way that is most convenient. And I am reminded that at Ahmed Khel, I saw the lance used in an unorthodox way. When fighting was over some people began walking among the dead and wounded Afghans, possibly, I fear, with a view of picking up curios. Massy, of the 19th Bengal Lancers, was one of them, and I suddenly caught sight of Massy running round in a circle trying to draw his sword, pursued by a big Afghan with a tulwar. Fortunately for Massy, his Lancer orderly was quite close, and running up, knocked the Afghan down with the butt end of his lance. This unorthodox use of his weapon probably saved his officer's life, or at any rate prevented a nasty wound. But I mention these two, rather personal, experiences to demonstrate that to be successful in mounted sports, the horse counts 75 per cent., and no time spent in its training is wasted.

In the Riding Troop we had, in those days, our own team and did a good deal of driving, occasionally doing driving tours, of which our C.O. was very fond. We had a good pair of wheelers from the troop, and drove our second chargers in the lead. I had one experience worth recording, being run away with by four horses in a light brake. It is quite an exhilarating entertainment, and, if one doesn't come to bad grief, quite good for the nerves.

It happened that we were training a new pair of leaders, and I was coming back along the Dartmouth road. The road approaching Shooter's Hill is very flat (it was there that Raikes of the Rifle Brigade backed himself to run a measured mile in five minutes, and won by ten seconds), and, with a light brake, the draught is transferred from the traces to the reins, one's arms acting as springs, and very painful ones too! Anyway, either excited by the swingle trees, or, more likely, urged by unskilful use of the whip, the team set off at full gallop. In spite of every appliance at hand, notably two pairs of strong arms, the only thing we could do was to keep them straight, and we were consoled by the fact that we were nearing the hill. However, we had to pass through a small village and I was rather anxious about the dogs and children. To our astonishment, the leaders' pace slackened, for the wheelers were unwilling participators, and we actually pulled up in the middle of the village. On investiga-

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tion the reason was obvious, for there, on our left, stood "The Dog and Partridge." Intelligent animals, horses, for the grooms admitted they occasionally "watered" there!

I always found the police most polite and helpful, when in difficulties, and one Derby day, driving the Horse Artillery coach off the course at Tattenham Corner, we had to pass through a fairly narrow roadway, opened on purpose for coaches and horse-driven vehicles. In front of me was a low basket carriage swaying about from one side to the other. Taking advantage of a sway to the right, I thought I had room, but the carriage swayed again, just as I thought we were past, and with a crash, we took off the left front wheel of the enemy. I was making arrangements to pull up, when the cheery voice of the mounted inspector was heard shouting, "Come along, captain, never mind him, he's drunk." So we went on, and I always thought the Inspector must have been a soldier, possibly a horse artilleryman.

In 1882, Allsop, who had joined the Riding Troop, took over the Drag hounds, and it is interesting to record that he invented the first hunt coat and button. Up to that time the staff had always hunted in mufti, except that the Master generally wore a tall hat, and top boots.

At Suakim, in 1885, G/B R.H.A. was serving, and they were noticed, especially for their smartness, by war correspondents. This was particularly noticeable because many of the units thought it the correct thing on service to be extremely dirty, and quite "chic" to grow scrubby beards. There, some of us had a useful but rather nasty experience. A squadron of the 5th Lancers was landing, and the horse gunners, very naturally, did all they could to make ready and assist. When the troop-horses landed, they were led from the ship to their lines, tho' it would have been wiser to have had them ridden. Very unfortunately, on the way they met a string of camels. Now English horses are terrified of these wild beasts, and take some time to get accustomed to them, and the consequence was, that most of the horses broke away. That was bad enough, but in that place there were numerous wells, quite unprotected, and for the next few days all hands were employed hoisting exhausted troop-horses from those horrible pits. For a few, the wells served as convenient graves.

At Umballa, in 1888, "Q" and "G" were quartered. Q was then K/B and I was captain in command, the Major being at home on leave. Our Colonel, Warter, whom I have mentioned before, was a great friend of Colonel Palmer's, commanding 9th Bengal Lancers. Many convivial evenings were spent, and all sorts of competitions and matches made. These culminated in a match, arranged by the two Colonels, in which the two horse batteries were to race the 9th Lancers from the parade ground to a native village about three miles across country, the first complete unit to arrive to win. Failing to arrive as a complete unit, which was really impossible, then whoever had the largest number of casualties, broken legs, lame horses, etc., was to stand a dinner. The course was not completed, but we had an excellent dinner at the expense of the two Colonels.

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About this time I received rather a shock, for one Sunday morning my Sergeant-major galloped, bare-back, into my compound, and breathlessly reported that the Farrier Sergeant had cut his throat. Then asked if he should send for the Chaplain to arrange the funeral. I asked him if the man was dead. "No, he's not dead," said the Sergeant-major, "but is dying." "Go away," I told him, "and get the doctor as soon as possible, and tell me when he is dead." So far from being buried, the Farrier Sergeant was tried by Court Martial a few days after, for, as the men said, "making a d——d bad job of it."

We had very keen practice camps, and the men were all quite excited about the prizes which were given for shooting. Even the drivers took a share in the excitement. A certain troop was doing very well in a pursuit scheme, when in those days the limbers reversed, and came up close, ready for advancing. Between two rounds a voice was heard exclaiming, "Good Lord, every bloomin' shot's goin' over." This was disastrous, for the camp commandant was standing among the guns, and tho' the shooting may have been quite decent, the marks for discipline were quite indecently few, and the lead driver of 3 gun sampled the water trough.

I was quartered at Jullundur in 1893 with R. L. Heygate as my Captain. We had a good many horses and ponies between us, and Heygate had leased a very good arab called "Snow" from de Lisle. Snow was sent to Calcutta in charge of MacDougall of 7th D.G's., for neither Heygate nor I could get away, to run in a pony steeple-chase. In due course we got a wire giving the starters and it looked a very good thing for Snow. Heygate undertook to put the money on, and telegraphed to MacDougall. Now there were three classes of telegrams in India, urgent, ordinary and deferred, the words express the order of importance and delivery. The deferred being sent off and delivered when the operator had nothing else to do. In the evening we got a wire to say Snow had won easily. So we felt happy and drank Snow's health in P.J. at dinner. Next morning came a wire to say, "Your telegram arrived after the races." Alas, Heygate had saved eight annas in telegrams, but lost some hundreds of rupees, for he had sent a deferred message. A case of "penny wise, pound foolish," and the question cropped up, who was to pay for the P.J!

At Jullundur we were quartered with the Buffs, and both units went to Peshawar, where the friendships of officers and men was cemented on many occasions. A proof of this, if proof were needed, was reported in the Buffs regimental magazine, which described the "marching-out" of the battery from Peshawar, headed by the Buffs canteen dog.

At St. John's Wood, in command of G., I came again in touch with the Military Tournament, for we had to perform the Musical Drive, and we were the first troop to take six guns into the Agricultural Hall for that purpose. I got an S.O.S. from Colonel Ward one night asking me if I could possibly enter a team for the Horse Artillery Driving Competition, as someone had ratted, and they must have four teams. I didn't like it much, as we had to have at least fifty horses

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to carry through the drive successfully. But Jenkinson, my Captain, and the Subalterns, not to be defeated, rigged out a team of some sort, really to help Ward, who was always most friendly to us, as our supply officer. I didn't take much interest in the competition, but heard casually from the Subalterns that pegs and posts were flying about the arena on the first day. During the week, for the competition lasted a week or so, I heard we were doing better, in fact going rather strong, and one night, they burst into the mess reporting that we had won the galloping prize. Now what strikes one is this. If you have to compete daily for accumulated marks, it is better not to have your animals wound up to concert pitch, for, as in this case, our team steadied down and improved, the others got tired and stale, and fell off.

There is rather an amusing story of the old Duke of Cambridge, who sometimes came with Albert Williams, then Col. Commdt. R.H.A., to see us at the "Wood." It was an inspection at Aldershot, and among the officers on parade was one who rode very good horses, and was very proud of them. As his troop marched past, Potts, we will call him, and others saw the Duke gesticulating and pointing at his charger, and assumed it was an indication of admiration. After parade, in the Mess, Potts was exuberant in explaining how the Duke had noticed "Warwick," his charger, and was ready to drink the Duke's health or anybody else's. But what actually happened was this. Potts assumed a rather hunting-cum-military seat, and carried his sword in a somewhat irregular manner, and the following conversation was reported from the saluting point.

The Duke: Who is that officer?
The Colonel: Mr. Potts, Sir!
The Duke: Send him to the r-r-riding school.
The Colonel: For how long, Sir?
The Duke: For ever-r-r.

But after a good lunch at the Mess it was said that the sentence was commuted to one of commiseration with the culprit.

Many tales could be told of the South African War. When under orders in 1899, with a little experience of picketing horses, and the knowledge that the majority of heel galls came from slack head ropes, I determined to try a method which consisted of using the wagons and stretching ropes breast high between them. This method was very soon noticed by other units, and became the general method of picketing artillery horses. I think Tip Hornby was the first to write and ask particulars, which I was glad to give. Later, when at the War Office, I had the satisfaction of correcting the plates for the drill book. Generally, my argument was, that it was better on service to have one or two abrasions or wounds from kicks than to have twenty cracked heels.

Fighting north of Pretoria one day, my troop was more or less in reserve, and had assumed a "position of readiness." It was, by accident, rather a good and commanding site. Just below us, in the lower ground, "O" was in action, and getting rather slated by Boer

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riflemen. We put a few shells over them by way of encouragement, and through our glasses, a figure was seen crawling among the bushes. This, we learnt afterwards, was the major, John Jervis, who was trying to attach a drag rope to one of the trails with a view of dragging the gun to a more favourable position. He was very angry, especially with the Boers, and his language was said to have started a veldt fire. Just as "O" had got out of difficulties I got an urgent message from Alderson (now Lieut.-General), commanding some M.I., that he could not get on, and asked for our help. We could see about where he was, but had to guess the position of his front line. There was no time to send out observers, the matter being urgent, and my men were shooting very well. So I fired common shell over his head at a range I knew would clear his people, and brought the range back, by I think, 100 yards, then 50, and loosed off some shrapnel. It had the desired effect, as we learnt at once by signal, and Alderson, with whom we had fought many days, came over and thanked us, and to this day often reminds me of getting him out of a hole. But this performance, which in our training of those days we called "supporting the infantry attack," and which is the only conceivable step to take under the circumstances, is now, since we have adopted more French words, called a "barrage." A word which once was associated with "damming the Nile," is now more associated with "blasting the Boche."

There is one pathetic tale, illustrating the spirit of our men. It was, especially I think with gunners, a matter of honour that as few things as possible should be abandoned on the veldt. A driver of "G" lost both his horses, but he walked into bivouac at night carrying a double set of harness. He was not well, and died eventually. But there is no doubt, in my mind, that his splendid gunner spirit militated against his recovery.

One often makes friendships on service from very trifling incidents.

On arrival at Kimberley, we had our escort, a squadron of the 1st Life Guards, bivouacking near us. After we had absorbed a rather sketchy meal, the subalterns went over to see them. They came back to say "The Lumpers" had nothing to eat or drink, their transport not having arrived. We immediately scraped together everything we had, in the way of food, and found half a bottle of whiskey as well. A procession was then formed, and we proceeded to the ditch, on which our friends were uncomfortably seated, and delivered the "goods." To this day, "Troops" Carter, now Clerk of the Ascot Course, introduces me as the man who saved his life, and threatens to recommend me for the O.B.E!

When I was in South Africa later, I used to go about to all the Agricultural shows, and do some of the judging. On one occasion I was associated with Mr. Schimpers, a well known and successful breeder. We were set to judge the ladies' riding competition. I was relieved to find that female attire did not count. But I asked Schimpers, who was an old hand at it, how we should proceed. "Oh!" said Schimpers, quite simple, I always give the prize to the best-looking woman, and all the rest 'highly commended.' "

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Although I was never very good at rifle shooting, I once won a prize. In Manchuria, with Kuroki's army, they had an annual Staff competition, and among others a foreign attaché's prize. In all about a dozen of all nationalities entered. I had a sort of trial run with some infantry who were training near, and, with a Japanese service rifle, hit the target several times. My fame soon spread, and I was heavily backed in sen (sen being about one-tenth of a farthing), to win. But probably the chief reason of favouritism was that I belonged to what they called "The Alliance Nation." However, the day arrived, and we all proceeded to loose off at a Japanese target at three hundred metres. The Japanese target is so many concentric circles, circles counting more as they approach the bull's eye. We had ten rounds to fire. I was shooting fairly steadily, the result of each round was signalled, and I was conscious of having behind me an admiring and excited crowd. My ninth shot I knew was a miss. Nothing was signalled, the bullet probably having buried itself in the sand half-way. To my astonishment, a hand came over my shoulder with a cartridge, and I was told, "another round please." I protested in vain, and was solemnly told that, by their regulations, a round *not* signalled was repeated. So I fired my two rounds and came out top. But nothing will convince me that it wasn't a "put-up job." For the Japanese Staff, it was arranged that Kuroki should win, and he won! At the prize-giving, I was embarrassed by receiving about an ordinary portmanteau full of every sort of Japanese production, including rolls of fine silk, which later adorned most of my female relations.

A little cricket story will be a change. In Ceylon, I was staying on leave, with my brother, who was a planter, and went to Colombo for the annual match, Up-Country v. Garrison. Being short of a man, I was "warned" for Up-Country. We went into the field, and for some reason, which was not apparent, my brother and I were put on to bowl. Now my brother, who was in the Wellington eleven, had a very doubtful action, and was often no-balled. I went on to bowl, and, to my astonishment, was no-balled. Out ran the captain of the other side, Churchill of the 58th, my father's old regiment, and there was a hurried consultation with both the umpires, the gist of which was, I learnt afterwards, that no-one, under any consideration, was to be no-balled! What had happened was, that as I was rather like my brother, and our names about the same, the umpire had selected the wrong man. But the sequel is a gunner story. Next morning, the umpire, a corporal in the Garrison Artillery approached me and humbly saluting, said, "I beg pardon, Sir, but if I had known as how you belonged to the regiment, I never would have no-balled you." Which shows a fine regimental spirit, but I am not quite satisfied that it was quite "cricket"!

W. N. Lloyd and I played a lot of regimental cricket, also played other things together in our younger days. We were guests in the same house at Ascot one year, and had to get back to Woolwich on Saturday morning, which meant leaving Ascot pretty early. Having dined well, and played all sorts of games, we found it was 4 a.m.,

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and decided it was not worth while going to bed. Eventually, we walked on to the garrison cricket ground, a pair of apparently played out, and certainly pallid, sportsmen. But one never quite knows the effect of dissipation. I suppose it affects people differently. Anyway, Lloyd got all the wickets, and I made all the runs, and we won the match!

My last tale is dedicated to the Horse Artillery. In the Jubilee Year, 1897, we had, with other mounted troops, to proceed through the East End of London, to show ourselves to the people of that district. We were, of course, in full dress, which meant, in those good old days, shabracques, and sabretaches. There was a vast crowd of people, many of the coster class, all most orderly and even entertaining. There were practically no police. The people made a narrow way for us, and I found women inspecting my dress sabretache, one of whom said, "Give us your feathers, old man," alluding to our plumes which were then egrette feathers. We were obliged to go very slowly, and little urchins caught hold of the horses' tails with a view of stopping them. Coming to a rather more crowded part, we heard a man shout out, "The Royal Horse Artillery," then another in a slightly husky voice, but evidently a horse gunner, gave out, "The Right of the Line," but another went one better, for in a rather more husky voice, came the words, "The Right of the World." So the good old Horse Artillery spirit lived in Whitechapel.

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ARTILLERY EQUIPMENTS USED IN THE FIELD DURING THE LAST 25 YEARS.

By MAJOR-GENL. SIR STANLEY VON DONOP, K.C.B., K.C.M.G.

THIS brief note on the artillery equipments supplied for use in the field during the last 25 years has been prepared at the request of the Committee of the R.A. Institution. The limitation of space only admits of what amounts practically to a comparison of the types and equipments in use during the period of the South African War (1899-1902) with those with which the Royal Artillery fought in the Great War (1914-1919), and together with a bare mention of those with which our batteries are now provided, the details of which cannot be included on account of their confidential nature.

ARTILLERY EQUIPMENT DURING THE SOUTH AFRICAN WAR, 1899-1902.

Horse and Field Artillery.

In 1899 the Horse and Field Artillery were armed with the following:—

(1) The 12 pr. B.L. gun firing a 12½ lb. shrapnel shell with a time fuze allowing for a range of 3800 yards.

(2) The 15 pr. B.L. gun firing a 14 lb. shrapnel shell with a time fuze allowing for a range of 4100 yards.

A new fuze sent out in 1900 increased the range of both these guns by 1800 yards.

The carriages of both these natures of gun were fitted with a recoil spade suspended under the axle by a telescopic spring case. By this means the gun and carriage returned after recoil to their approximate position, but it could in no sense be called a quick firing gun.

A telescopic sight (with inverted image) was provided but had to be removed for firing.

(3) The 5 inch B.L. Howitzer with a 50 lb. lyddite shell and a range of 4800 yards. The cradle was fitted with small recoil buffers and recuperating springs, further partial checking of recoil being effected by brake drag shoes.

A few batteries at home were during the period of this war provided with a special equipment of 15 pr. Q.F. guns, having a 14 lb. shell and a time fuze allowing a range of 6400 yards. These batteries were subsequently handed over to the Territorial Horse Artillery and movable armaments abroad.

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Mountain Artillery.

The Mountain Artillery were armed with the 2·5 inch R.M.L. gun firing a 7 lb. shell with a range of 4000 yards, but only 3300 yards with shrapnel.

Heavy and Medium Artillery.

The Heavy and Medium Artillery equipments used by the R.G.A. during the S. African War were :—

6 inch B.L. Howitzer firing a 120 lb. lyddite shell and having a maximum range of 5200 yards.

9.45 inch B.L. Howitzer, firing a 280 lb. H.E. shell and having a maximum range of 6500 yards.

4·7 inch Q.F. guns, firing a 45 lb. H.E. and shrapnel shell with a range of 10,000 yards (percussion).

5 inch B.L. guns, firing a 50 lb. H.E. shell with a range of 8700 yards (percussion).

Both of these were mounted on improvised carriages.

During the war the 1 pr. automatic gun known as the pom-pom was issued, and Sections of Artillery armed with this were distributed among the many mobile columns. The gun had a range of 3500 yards and the small shell was filled with powder.

1902—1913.

As was only to be expected, the close of the South African War together with the experience it brought, led to the serious consideration of the changes necessary to improve our equipments. Regimental Committees were formed, conditions laid down and designs called for and selected equipments were made for trial. This all took time, but to show that there was no undue delay it is sufficient to say that during the year 1903 the Horse and Field Artillery experimental equipments were tried and the new designs adopted for manufacture and supply. In 1904 the same stage was arrived at with regard to the Field Howitzer and heavy artillery equipments, and when in August, 1914, the occasion for the real test of all these arose, the Artillery were armed with their new equipments, complete according to the scale then authorised.

These new equipments were vastly superior in every respect to those of the 1900 period.

Horse and Field Artillery.

Without going into small details, the outstanding changes were as follows and applied equally to guns of the Horse and of the Field Artillery, the main difference of the two being that the Horse Artillery gun was a 13 pr. firing a $12\frac{1}{2}$ lb. shell and that of the Field Artillery was an 18 pr. firing an $18\frac{1}{2}$ lb. shell, while the weights of the two equipments varied in a similar proportion.

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1. The breech mechanism was of the single motion instead of the three motion type, and the old firing lanyard was replaced by a lever.
2. Fixed ammunition was used, so doing away with the shell, the cartridge and the tube all having to be loaded separately.
3. The time and percussion fuze was self-clamping and so the old clamping nut and spanner as well as the safety pins were avoided. A fuze indicator dial with a corrector, subsequently replaced by a fuze bar indicator, rendered the necessary orders for the fuze setting to be much simplified and shortened.
4. The recoil buffer and running out springs, together with the trail spade and tire brakes, allowed the carriage to remain stationary on the gun being fired.
5. By the provision of separate elevating gears for both the gun in its cradle and the cradle in the carriage the independent line of sight system was adopted, thus allowing the layer to remain seated and looking through his telescope continually at the target while the necessary elevation could be given by another number without disturbing him, and if necessary altered without requiring relaying.

   A small amount of traverse without moving the trail was possible, and a clinometer was fitted semi-permanently to the carriage.

   When the equipments were first issued they were provided with a simple form of dial sight, attached to the shield, but this was soon replaced by a more elaborate and accurate design with a telescopic periscope giving an all round view and fitted to the carriage itself.
6. Shields giving cover to the working numbers at the gun were fitted. The lids and sides of the limber boxes were also of a protective thickness of steel.

   It will be seen from the above how greatly the service of the gun was facilitated and accelerated, a rate of fire of 20 approximately aimed rounds a minute being achieved. The range of the shrapnel was 6500 yards, and the shell itself being 18½ lbs. in weight was a powerful and efficient man-killing projectile.

   Case shot were finally abolished for the field equipment, it being considered that shrapnel, fuzed very short, was sufficient for the purpose.

Among the many additional adjuncts provided during the period 1903-1914 were particularly those necessary in the use of covered positions controlled from distant observing stations, viz. :—

Directors, first of a simple form and later on of more elaborate design.

One man range finders taking the place of the mekometer or telemeter.

Telephone equipment.

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While most of the requirements asked for were met by those responsible for the new designs, there were certainly some defects.

In the first place the carriage was not sufficiently steady on firing and it was invariably found necessary to relay the gun after each round. This defect was partially remedied before the war, but a further great improvement in this respect was during the war made by the substitution of an air recuperator in place of the spring recuperator, so that in the equipment now in use no fault, it is believed, is found in connection with this point. This also conferred the additional advantage that owing to the increased power of the air recuperator over spring recuperation the gun could be fired up to angles of elevation of 30°.

A strong demand was made for an automatic fuze setter, such that when the range and fuze in any series was found a number of fuzes could be generally set to the one particular setting required. Every effort was made to supply this want and a number of designs were submitted and tried but none were found to work with the speed and accuracy required. It is believed that during the Great War the want of an automatic fuze setter was seldom, if ever, felt.

The question of supplying the Horse and Field Artillery guns with high explosive shell was very seriously discussed when the experimental equipments were being tried, it being held by many to be most necessary for the *direct attack of shielded guns*. It was however found by trial that a direct hit with a shrapnel shell on the shield of a field gun knocked out the latter and its detachment although not as completely as a high explosive shell would have done. It was therefore decided to adhere to shrapnel alone. The General Staff in agreeing with this decision said "they were taking a perfectly sound course as provision had been made for shrapnel fire being supplemented by that of high explosive shell by adding a proportion of howitzers to each division." [1]

Before the end of August, 1914 it was suggested from the War Office that some high explosive shell might be found useful for the Horse and Field Artillery and although the response from G.H.Q. was not very enthusiastic, 1000 experimental rounds were supplied with the result that more were at once demanded, first on a scale of 25 per cent. and subsequently 50 per cent.

For many years previous to this endeavours had been made by all the English fuze designers, but without success, to design a safe and efficient graze fuze for high explosive shell for heavy and siege artillery and therefore when this supply was required for the field guns the difficulty had to be met by using two fuzes for each shell, an obviously unsatisfactory and uneconomical arrangement that was shortly afterwards done away with by the production of a suitable graze fuze, the design of which though modified in some details remained the same in principle till the end of the war.

[1] This and a subsequent quotation (on page 484) from the opinion of the General Staff are not reproduced in any critical spirit, but merely to indicate that in both instances the questions had been fully discussed by those responsible at Headquarters.

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A still further improvement to meet the demands from the front was subsequently made by another design of percussion fuze giving instantaneous action, this quality being particularly required for the destruction of wire by high explosive shell as well as for dealing with personnel in the open.

During 1918 in addition to the changes made in the 18 pr. carriages to improve the steadiness on firing, steps were taken to give increased range, this being effected partly by higher angles of elevation being obtained and partly by alteration in the shape of the shell. An improved pattern of breech mechanism was also introduced while considerable traverse was rendered possible. As soon as a commencement was made in the supply of the 18 pr. equipment in 1907, the old 15 prs. were converted into B.L.C. and issued to the Territorial Artillery—these formed their equipment in the early stages of the war. The conversion consisted of the provision of a long recoil buffer and spring recuperator together with a trail spade, a single motion breech mechanism, an improvised telescopic sight and a shield were also added.

As soon as the supply admitted, these equipments, as well as the 4·7 inch guns supplied to the Territorial Heavy Artillery, were replaced by the 18 prs. and 60 prs. respectively.

In 1909 the Field Howitzer Brigades had their 5 inch B.L. howitzers replaced by the new 4·5 inch Q.F. howitzer. In addition to this howitzer being fitted with a quick firing breech mechanism of the sliding block type with obturation obtained by the use of metal cartridge cases, the carriage was provided with a trail spade, a panoramic dial telescopic sight and quick release elevating gear. The range was 7000 yards with H.E. and 6500 yards with shrapnel. Ammunition was in the proportion 70 per cent. shrapnel and 30 per cent. H.E., but the use and issue of shrapnel was stopped very early in the war. This howitzer was very much in demand for our allies and many sets of equipment were supplied to them.

Mountain or (as now called) Pack Artillery.

In 1902 the 2·5 inch R.M.L. gun was replaced by the 10 pr. B.L. In addition to its being a breech loading gun the equipment had the following advantages—(1) increase in weight of shell from 7lbs. to 10 lbs; (2) increase in range; (3) smokeless propellant; (4) improved junction nut which was screwed up by a wrench so avoiding the use of a hammer; (5) improved elevating gear. There were only minor changes in the carriage. By 1911 a decision had been arrived at to re-arm with the 2·75 inch B.L. gun. The gun itself was identical with the 10 pr., the difference lying in the carriage in which a longer and jointed trail was used and a cradle which allowed the recoil of the gun on firing. The axle was reversible thus allowing the gun to be higher or lower according to the elevation required and the necessity for cover. The maximum elevation was 22 degrees. A shield was also fitted.

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The equipment was carried on six mules instead of the five required for the 10 pr. and both shrapnel and H.E. shell were issued, the weight of the shell being 12½ lbs. and the range 5800 yards.

At the same time the provision of a mountain howitzer was also considered, but the experimental equipment, though tried, had not been finally approved by August, 1914. In 1915 however it was adopted for manufacture. It consisted of a 3·7 inch Q.F. howitzer firing a 20 lb. shell and mounted on a carriage with a split trail—the first introduced into the British Artillery. It allowed a traverse of 40° and elevation of 44°, the maximum range being 6000 yards.

The equipment was carried on 8 mules.

Divisional Heavy Batteries.

Experience in S. Africa having proved the value of a heavy gun in the field, each division in England was in 1906 provided with a 4-gun battery of 60 pr. B.L. guns. The carriage was fitted with two recoil cylinders and recuperating springs, a trail spade and firing drag shoes and thus remained fairly steady on firing. The top carriage could be run back so as to distribute the weight while travelling. Ammunition was on the scale of 70 per cent. shrapnel and 30 per cent. Lyddite.

During the war the range was, by an alteration in the shape of shell increased from 10,500 yards to 12,300 yards. This equipment was heavy to move (104 cwt.) and considerable trouble was experienced in the connections between the gun carriage and limber. In order to simplify manufacture during the war a modified carriage with no alternative travelling position for the gun was brought in and this added to the trouble by bringing too much weight on the gun wheels.

Towards the close of the war a gun and carriage of new designs approximating to those of the 18 pr. equipment, only on a larger scale, were designed, tried and adopted for future manufacture. A range of 16,000 yards was obtained and a high degree of steadiness reached. All 60 pr. batteries were horse drawn throughout the war and hitherto no change has been made in this respect.

Heavy and Medium Artillery.

It has often been stated that we were very much behindhand in not having the heavy guns and heavy howitzers necessary for a campaign. Those mentioned as having been employed in S. Africa were admittedly hastily prepared as makeshifts to meet a sudden demand. It must however be remembered that the French and Germans had always been preparing for a continental war with fortresses but our General Staff had maintained that we should not have to attack land fortresses.

There had been for years a strong disinclination, to use no stronger word, to the provision of anything of the nature of up-to-date siege artillery or ordnance heavier than the 60 pr. B.L. gun. There had been since the S. African war 4 batteries of 6 inch B.L. howitzers

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of a very old pattern and one battery of unsatisfactory 9.45 inch howitzers.

Strong representations were however made from certain quarters, recommending that a modern carriage of a new recoil type should be provided for the 6 inch B.L. howitzer and that a new design of a heavy howitzer should be decided upon and made for trial. It was also strongly urged that one or more of the Siege Companies should, with their 6 inch B.L. howitzers, take part as mobile units in the field army manœuvres, so that among other things the possibilities and limitiations of a mobile 6 inch howitzer battery in the field could be ascertained not only by the Siege Artillery but by general officers and others under whom these batteries would have to serve.

These representations were, it is believed, met by the argument that there was little likelihood of English Siege Artillery on anything approaching a large scale being required, and in 1909 the General Staff stated that "it was doubtful whether the tendency of field operations to approximate towards siege warfare as manifested under the exceptional conditions of the war in Manchuria could with sufficient reason be believed to be a general tendency or whether in other theatres of war time would be available for the construction of elaborate entrenchments." Steps however were taken in 1909 to proceed with experimental heavy howitzers, but it was not until June 1914 that the trial of the first and only 9·2 inch howitzer ("Mother") was carried out. Luckily the trial proved that the design with the exception of some unimportant modifications was suitable, and orders for the manufacture of more were consequently placed at once on the declaration of war.

The equipment consisted of three loads (the heaviest of which weighed $4\frac{1}{4}$ tons) carried on suitable vehicles. Elevation up to 45° was possible and the extreme range with its 290 lb. shell was 10,000 yards. Subsequently with some modification in the carriage and with an improved shape of shell, some 2700 yards more was obtained.

On the outbreak of war it was decided to send to France at once the 4 batteries of 6 inch B.L. howitzers of 30 cwt., notwithstanding that they were far from being of a modern type. About fifty more were also collected from various stations and sent overseas—the only changes of importance made in the equipment since the S. African days being the substitution of 100 lb. for the 120 lb. shell and so increasing the range from 5200 yards to 7800 yards and the provision of up-to-date dial sights.

In January 1915 a new design of 6 inch howitzer of 26 cwt. was put in hand and after a successful trial, orders were given for manufacture.

This howitzer had a new type of breech mechanism, while the carriage was provided with a modern recoil buffer, improved dial sight, traversing gear and (wheel) girdles. During the war a rifle mechanism firing small arm cartridges was substituted for the T friction tube system and this obviated the abnormal wear of the vents which had become apparent.

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The range was at first 9300 yards increased later on to 11,800 yards with a new design of shell.

There being no time to allow of a trial howitzer of a heavier type, steps were at once taken to manufacture some batteries of 12 inch B.L. howitzers, some being of a design as far as possible on the lines of the 9·2 inch and others of a pattern for use on a railway mounting. Later on when increased range was found necessary improved designs both for railway mountings and road type were supplied.

The weight of the high explosive shell was 750 lbs. and with the earlier designs a range of 11,000 yards was obtained, while with the later designs this was increased to 14,000 yards.

While waiting for the manufacture of the 9·2 inch and 12 inch equipments a number of 8 inch howitzer equipments were improvised by cutting down and boring out surplus 6 inch B.L. guns and mounting them and their cradles on simple carriages with traction engine wheels. The equipment was consequently heavy, the weight being 14 tons and the maximum range 10,700 yards. Subsequently an 8 inch howitzer and carriage on the lines of the 6 inch howitzer of 26 cwt. was produced and supplied weighing nearly 10 tons and giving a range of 10,000 yards. A later design was supplied of which the weight was very slightly increased and the range was 12,000 yards.

At the same time a number of B.L. guns Mark VII taken from the Coast Artillery were mounted on field carriages, fitted with traction engine wheels and long recoil scotches and sent overseas. With an elevation of 33 degrees a range of 17,700 yards was obtained but the weight of the equipment was 26 tons, but subsequently this was reduced to under 17 tons.

Later on in the war a 6 inch gun of 35 calibres (instead of 45 calibres) was supplied and this mounted on the new 8 inch carriage allowed an equal range being obtained with an equipment weighing about 10 tons.

In 1914 shortly after the orders had been placed for the 9·2 inch and 12 inch howitzers a design for a 15 inch howitzer was submitted to the War Office but it was decided to adhere to a pattern already tried and found satisfactory. The Admiralty however ordered some of this type and when received they were sent over to France with detachments furnished by the Royal Marine Artillery. The shell weighed 1450 lbs., and the range was 11,000 yards.

A number of 9.2 inch B.L. guns used by the Coast Artillery were mounted on railway mountings and sent to France. The earlier ones sent out were old pattern guns, the mountings allowed very limited traverse, but subsequently a later mark of gun on railway mountings with all round traverse was supplied.

These latter equipments allowed a range of 26,000 yards with the 380 lb. shell.

A limited number of 12 inch B.L. naval guns were also made available and fitted on to railway mountings, a range of from 28,000

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yards to 38,000 yards (according to the mounting) being reached. The weight of shell was 850 lbs.

Some 14 inch B.L. guns, weighing, with the mounting, some 250 tons, were also used in France, the weight of shell being 1400 lbs. and the extreme range 35,000 yards.

Anti-Aircraft Artillery.

In 1913 trials were carried out with two anti-aircraft equipments both designed on much the same lines but one being a 4 inch and one a 3 inch gun but manufacture had only commenced on a small scale before the war. As soon as it was possible to do so without interfering with other more pressing needs, steps were taken to manufacture 3 inch equipments. The gun, fitted with a semi-automatic sliding wedge mechanism moving vertically[1] was mounted on a pedestal mounting allowing all round traverse and full elevation of 90° and provided with an elevating gear and telescopic sight on one side and traversing gear and telescopic sight on the other. It was also fitted with compensating and adjusting gears, improved from time to time as this new form of gunnery, necessitating the use of the third dimension, was developed.

The ammunition included both H.E. and shrapnel shell weighing 12½ lbs with an extreme height range of 24,000 feet. Later a 16 lb. projectile was introduced having an extreme height range of 21,000 feet. Some of these guns were mounted on travelling platforms and so formed semi-mobile equipments.

Before these equipments were available the requirements for anti-aircraft guns was partially met in the first instance by despatching overseas a limited number of 1 pr. Q.F. guns (pom-poms), followed by mounting some 13 pr. Q.F. Horse Artillery guns on improvised pedestal mountings carried on motor lorries. Subsequently 13 pr. guns of 9 cwt. and of 3 inch calibre, but in other respects similar to the 18 pr. Q.F. guns were introduced, being mounted in a similar fashion. With this gun a height of 19,000 feet with elevation of 80° was obtained. This latter formed the semi-mobile equipment to the end of the war.

In addition to the changes to the guns and equipment mentioned it must be remembered that many new types of shell, fuzes, etc., were introduced during the war. To mention only a few :—

Incendiary and anti-Zeppelin incendiary shell.
Chemical shell.
Smoke shell.
Star shell, etc., etc., and a number of new fuzes.

New propellants and high explosives were also supplied.

Space does not admit of more than a statement of how the use of mechanical transport has been and is still being developed for nearly all artillery equipments used in the field.

[1] Subsequently swinging block without S.A. mechanism was adopted to simplify manufacture.

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Nomenclature.	Year in which Introduced.	Calibre of Gun.	Weight of Gun.	Weight of Shell.	Approximate weight of Equipment.	Maximum Elevation.	Maximum Range.	
							Shrapnel.	H.E.
HORSE ARTILLERY.								
		inches.		lbs.			yards.	yards.
12-pr. B.L.	1893	3	6 cwt.	12½	31 cwt.	16°	3,800 / 5,600	—
13-pr. Q.F.	1904	3	6 cwt.	12½	33 cwt.	16°	6,200	6,200[1]
FIELD ARTILLERY.								
15-pr. B.L.	1894	3	7 cwt.	14	36 cwt.	16°	4,100 / 6,000	—
15-pr. B.L.C.	1907	3	8 cwt.	14	42 cwt.	16°	5,750	5,750[1]
18-pr. Q.F. I.	1904	3·3	9 cwt.	18½	40 cwt.	16°	6,500	6,500[1]
18-pr. Q.F.	1917	3·3	8½ cwt.	18½	42 cwt.	30°	6,500	9,000
5″ B.L. How.	1895	5	9½ cwt.	50	43 cwt.	45°	—	4,800
4·5″ Q.F. How.	1909	4·5	8½ cwt.	35	41 cwt.	45°	6,500	7,000
MOUNTAIN ARTILLERY. (Now called Pack Artillery).								
2·5′ R.M.L. gun	1880	2·5	400 lbs.	7	—	25°	3,300	4,000[2]
10-pr. B.L. gun	1902	2·75	418 lbs.	10 1/16	—	25°	6,000 (Perc.) / 3,700 (Time)	—
2·75″ B.L. gun.	1911	2·75	414 lbs.	12½	—	22° high / 15° low	5,600	5,800
3·7″ Q.F. How.	1915	3·7	459 lbs.	20	—	40°	—	6,000
MEDIUM AND HEAVY ARTILLERY.								
4·7″ Q.F.	1895	4·7	41¾ cwt.	45	88½ cwt.	20°	10,000 (Perc.)	10,000
5″ B.L.	1890	5	40 cwt.	50	85 cwt.	25°	8,700 (Perc.)	8,700
60-pr. B.L. I.	1904	5	39 cwt.	60	104 cwt.	21° 30″	12,300[3]	12,300[3]
60-pr. B.L. II.	1918	5	43 cwt.	60	127 cwt.	35°	15,100	16,000

[1] When issued in 1914. [2] Common shell. [3] With shell of 8 calibre radius of head.

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DETAILS OF EQUIPMENTS MENTIONED.—(Continued.)

Nomenclature.	Year in which Introduced.	Calibre of Gun.	Weight of Gun.	Weight of Shell.	Approximate weight of Equipment.	Maximum Elevation.	Maximum Range.	
							Shrapnel.	H.E.
		MEDIUM AND HEAVY ARTILLERY. (*Contd.*)						
		inches.		lbs.			yards.	yards.
6″ B.L. How. 30 cwt. ...	1896	6	29 cwt.	120 & 100	85 cwt.	35° travelling carr. 70° platform	—	5,200 7,000
6″ B.L. How. 26 cwt. ...	1915	6	25½ cwt.	100	82½ cwt.	45°	—	9,300
6″ B.L. gun. VII. ...	1898	6	7½ tons.	100	17 tons	22°	—	17,700
6″ B.L. gun. XIX. ...	1916	6	4½ tons.	100	10 tons	38°	—	17,500
8″ B.L. How. I.	1914	8	5 tons.	200	14 tons	45°	—	10,700
8″ B.L. How.	1917	8	3½ tons.	200	10 tons	50°	—	12,000
9·2″ B.L. How. I. ...	1914	9·2	3 tons.	290	15 tons	45°	—	10,000
9·2″ B.L. How. II. ...	1917	9·2	4½ tons.	290	18 tons	45°	—	13.000
9·45″ B.L. How.	1900	9·45	41½ cwt.	280	9 tons	42° to 63°	—	6,500
12″ B.L. How. I. ...	1915	12	9 tons.	750	58 tons	65°	—	11,000
12″ B.L. How. II. ...	1915	12	7½ tons.	750	61½ tons	65°	—	11,000
12″ B.L. How. IV. ...	1917	12	9 tons.	750	61½ tons	65°	—	14,000
15″ B.L. How.	1915	15	10¾ tons.	1400	—	45°	—	11,000
9·2″ B.L. gun. VI. ...	1888	9·2	22 tons.	380	88 tons	30°	—	22,000
9·2″ B.L. gun. XIV. ...	1916	9·2	28 tons.	380	94 tons	30°	—	26,000
12″ B.L. gun	1916	12	50 tons.	850	185 tons	35½°	—	38,000
14″ B.L. gun	1917	14	83 tons.	1400	246 tons	40°	—	35,000
		ANTI-AIRCRAFT ARTILLERY.					Maximum height.	
							ft.	ft.
13-pr. A.A.	1914	3	6 cwt.	12½	7 tons	70°	17,000	17,000
13-pr. A.A.	1915	3	9 cwt.	12½	7½ tons	80°	19,000	19,000
3″ Q.F. A.A.	1918	3	20 cwt.	12½ 16	8¾ tons 6½ tons	90°	24,000 21,000	24,000 21,000
4″ Q.F. A.A.	1918	4	42 cwt.	31	8 tons	80°	30,000	30,000

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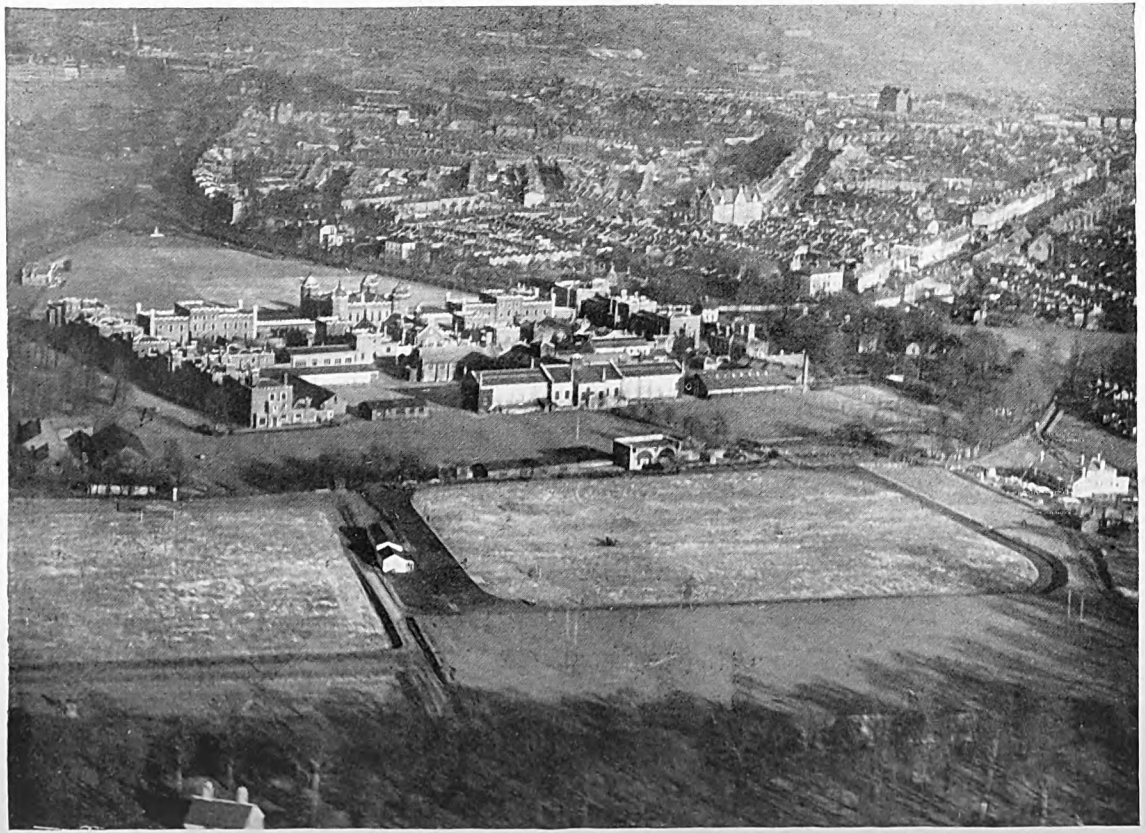

R.M. Academy from the air.

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THE ROYAL MILITARY ACADEMY.

By MAJOR.-GENERAL SIR W. GILLMAN, K.C.M.G., C.B., D.S.O.

THE Royal Military Academy was instituted and endowed by George II. in 1741, by warrant addressed to the Master General of the Ordnance, for the purpose of "instructing the raw and inexperienced people belonging to the military branch of this office (the ordnance) in the several parts of mathematics necessary to qualify them for the service of the Artillery and the business of Engineers." The Warrant added that "there is a convenient room at Woolwich Warren which may be fitted up for that purpose." The sum of only £500 per annum was set aside to cover the expense of the Warren, including the salaries of a "skilful Master and assistants"! This sum was however, doubled in the following year.

Those attending the lectures at the Warren, which was situated in the Arsenal, consisted of practitioner engineers, officers, sergeants, corporals, and cadets of the Royal Regiment of Artillery not on duty, and also such bombardiers, miners, pontoonmen, mattrosses and others of the said Regiment as desired to do so. The instruction consisted in:—

(a). Gunnery—manufacture of guns, gunpowder and fireworks, details of the several pieces of ordnance, and doctrine of projectiles.

(b). Fortification—attack and defence of fortresses, mines, levelling, water supply and draining of morasses.

(c). Mathematics—trigonometry, conic sections, practical geometry and mechanics.

(d). French—though but little seems to have been taught of this language, for the French master is reported to have been absent on one occasion for two months, and his salary was only £40 a year.

1744. In 1744, the cadets who up till that date had been divided up amongst the eight marching companies of the Regiment of Royal Artillery which then existed, were formed into one company of 40 gentlemen cadets under a staff consisting of 1

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captain-lieutenant, 1 lieutenant, 1 second lieutenant, 1 lieutenant-fireworker and 1 drum-major. The warrant authorising this order was headed "Royal Military Academy."

At this period the ages of the cadets varied from 10 to 30 years, and this discrepancy of age was one of the chief causes of the rioting and rowdiness which made the Academy a by-word about 1750, the cadets being described at that time as "fellows whose most honourable epithet is wild." In 1767 it is stated that of 43 cadets, who were being examined, eight were 19 years old, and the two youngest 12 years.

1766. In 1766, two Academies were started, an upper and a lower. No military subjects were taught in the lower, but only mathematics, drawing, Latin and French. When a cadet had qualified in these subjects, and could read and write freely, he was posted to the Upper Academy.

In 1774 the first entrance examination was held, and in 1791 an extra number of cadets were taken in at the request of the East India Company. During this period the system of education was improved and the staff increased, and in 1796 with 90 cadets the establishment of the staff was:—1 lieutenant governor, 1 inspector, 1 professor of fortification, and artillery with an assistant, 1 professor of mathematics with an assistant, 2 drawing masters, 1 fencing master, 1 French master, 1 dancing master, 1 master for classics and writing, and 2 model makers.

1800. The commencement of the 19th century ushered in many changes. In 1800 increased accommodation was required consequent on the junction of the Irish with the British Artillery, and it was decided to build new barracks on Woolwich Common to make up for the deficiency of accommodation at the Warren. In 1803 the total number of cadets was increased to 180, of whom 80 were sent to the Royal Military College, Great Marlow. One third of these totals were East India Company

1806. cadets. In 1806, 128 gentlemen cadets first occupied the old centre portion of the present R.M. Academy building; the remainder were at the Warren or Great Marlow.

1810. In 1810 the East India Company formed a "seminary" at Addiscombe for preparing officers for their own artillery and engineers, and withdrew their cadets from the Academy. The remainder of the cadets of the King's army were then brought to the Academy.

In 1816 the bathing pond west of the Common was made and was in use up till 1890, when the present swimming bath was commenced.

The demand for officers ceased after the Napoleonic wars, and the numbers at the Academy became less in consequence.

1819. By the end of 1819, there were 100 cadets in the Upper and 50 in the Lower Academy, but the Duke of Wellington, who then was Master General of Ordnance, decided to utilise the Lower Academy to accommodate only those cadets, usually 40 in number, who were considered fit to receive commissions.

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These were put through a practical course until commissioned. This course was kept up for many years, and the cadets were moved in 1856 into what are now the Grand Depôt Barracks, in order to make room for changes in the Arsenal.

The cadets' hospital at this period was known as the Cube House and stood where the Commandant's (Governor's) House
1829. now stands. In 1829, however, the lieutenant governor was moved from his quarters in the Arsenal and installed in the Cube House. Nos. 65 and 66 The Common, were then built as a hospital and medical officers quarters, and have been used as such ever since.

In 1830, riding was started and ten senior cadets were sent twice a week for instruction.

1847. In 1847, Captain F. M. Eardley-Wilmot was appointed captain of the cadet company, a post he held till 1854. He found that the discipline left much to be desired, and that bullying and ragging of neuxes (or snookers as they are now called) was much too prevalent. He quickly realised that lack of amusement and rational employment led to mischief and disturbances both inside and outside the enclosure. Even in those days the Academy was at times the subject of public criticism, and in one of his letters Eardley-Wilmot writes "I never expected to command 200 angels, though that sulphureous spirit, the British public, usually thinks that the cadets ought to be such." He had workshops built, and organised amusements inside the boundaries of the Academy. He started the athletic sports and presented the Challenge Bugle. To his efforts, also, the dining hall is indebted for its stained glass windows for which he collected £310. But his chief asset was his outstanding personality by means of which he gained the confidence of the cadets. He may truly be said to be the founder of the "Shop spirit."

A side light as to the possibilities of mobilising the artillery is given in one of Eardley-Wilmot's letters in which he writes that "the state of the Ordnance Corps is rotten as regards the artillery. Senior captains are 57 years of age. Everyone's time is taken up with ridiculous guards and duties. The Master General has just told Prince Albert that, in case of invasion, he could bring 36 guns to any part of the coast at any moment; but I know that only 22 of these guns are horsed, and only 16 have wagons, while the men do not know how to ride."

1861. After his departure matters generally improved, though once there was a set back after the Crimean and Mutiny campaigns, when the Academy was filled up with a medley of cadets of varying ages. This culminated in the so-called mutiny of 1861, during which the Waterloo guns were thrown into the ha-ha, and a gun loaded with bread was pointed at the governor's house.

During this period the cadets were taken to see mortar practice from the Repository at targets on the top of the

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Common. Fees, also, which had varied from £80 to £20 were raised so as to vary from £125 to £20.

The period 1855 to 1864 was one of transition, and the manner of admission, examination and treatment of the cadets all underwent great changes. In 1855 the old Ordnance Corps became defunct, and the administration of the Academy was transferred to the War office. The Commander-in-chief became governor. Up to that date nominations had been the gift of the Master General, who subsequently appointed each successful candidate to be "one of the company of gentlemen cadets in the Royal Regiment of Artillery," the cadet company being always designated the 1st Company, R.A. Now, however, things were changed. The Commander-in-chief instituted competitive examinations open to the whole country, and preliminary nominations ceased.

In 1859 the East India Company's forces were amalgamated with the Queen's army, and Addiscombe was abolished in 1861. In the same year considerable additions were made to the Academy. The east and west wings were converted into cadets' quarters, and the present workshops, school of arms and racket courts were built. The old boundary walls were removed and replaced by the present big iron railings. It was not however, till 1877 that the ha-ha was filled in, the present east and west lodges built, the old entrance removed and the present cricket ground surrounded by the triangular enclosure. In 1862 the age at entrance was from 16 to 19* years, and the cadet company was divided into A, B and C Divisions, and remained as such until 1882, when they became the 1st, 2nd and 3rd Divisions and later the Right, Centre and Left Divisions.

1861 to 1868.

As the mutiny was forgotten the Shop became more tranquil. Discipline improved in spite of the number of civilian instructors, whose power of keeping order was often very limited, and many restrictions were removed. In 1864 the cells, known as the Black Holes, were abolished and were converted into an armoury. Some officers still survive who tasted the doubtful pleasure of solitary confinement therein, but their numbers are now, alas, exceedingly few. Smoking, which had been severely punished for the preceding 100 years, was permitted in 1868, and a billiard room was built in the same year. Fixed hours were allotted to recreation, and the R.A. Band commenced to play in the Academy—a privilege which has been much appreciated ever since.

In this year it is of interest to note that the first Royal Commission was convened which had, inter alia, to enquire into the question of the amalgamation of Woolwich and Sandhurst. The Duke of Cambridge, who was then Commander-in-chief, vetoed the proposal because "the requirements of the Ordnance Corps were so scientific," that proximity to Woolwich

* In 1870 the age was altered from 16 to 18.

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Arsenal was essential.[1] This question of amalgamation has reappeared at intervals, the last occasion being in 1923. Now that proximity to the Arsenal is no longer necessary, there are very strong reasons in its favour in order to prevent cadets being trained in water-tight compartments, but the initial expense connected with the proposal are likely to postpone it indefinitely. Accommodation would have to be provided for both cadets and instructional staff; class rooms, laboratories, gun sheds and riding schools would have to be built; and recreation grounds would have to be made.

The Duke of Connaught joined as a cadet in 1867, and the Prince Imperial in 1872. Major General Sir Lintorn Simmons became the first resident governor in 1870, and his staff consisted of a secretary and treasurer, an adjutant and quarter-
1870. master, and, as company officers, 1 captain and 3 lieutenants. The Governor's (now the Commandant's) House was completed in 1876. In 1878 the south-west wing (S to Z houses) was built, and in the following year the A Division (seniors) dining hall was made. In 1873 the library and centre block was burnt out by a fire.

1889 to 1908. Bifurcation was tried from 1889 to 1896. This allowed the top cadets to select R.E. at the end of their first year, and during their second year the R.A. and R.E. cadets specialised to a certain extent in their own branch. It was dropped because some of the R.E. cadets ceased to work once they had gained their object in passing into the R.E. The system was restarted again during the Great War and is in force at the present time (1923).

In 1890, No. 63 The Common was taken over as a mess and quarters for the staff, but was subsequently given up. The dining hall, also, was enlarged northwards. In 1892, the S.E. Wing (rudely called the sewer) was built, and in 1897 the gratings over the cadets windows were removed.[2] The Shop[3] Magazine was started in 1900.

During the last years of the 19th Century the organization was in three divisions; each division consisted of one of the three junior terms, while the senior term were made corporals and divided up amongst the three divisions. This system continued till 1904 when the Right, Centre, and Left Divisions became Nos. 1, 2 and 3 Companies. The company or division commander was a lieutenant, and none of the other officers took much interest in the cadets except as instructors. In 1908 the company commander had a duty subaltern posted to help him, and since that date an ever increasing interest has been taken by all the other company officers, who in addition are assistant instructors, in the physical training and games

[1] It was not till the outbreak of war in 1914 that visits to the Arsenal ceased. Their object was to demonstrate practically the manufacture of ordnance, ammunition and carriages.

[2] Tin huts to hold 20 cadets were built near the swimming bath in 1900.

[3] The origin of the nickname "Shop" is unknown.

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of the cadets. The three chief instructors—artillery, engineering and tactics—are outside the company organization.

On November 5th, 1898, the cadets in the S.E. Wing were raided by those belonging to another term, who were celebrating Guy Fawkes' night rather too vigorously. Warning had however, been given, and the defenders left a small party to hold the upper storeys, and, when the attack was launched, they sent their main body to "make hay" in the attackers' rooms. The tactical ability of their leader has borne fruit in recent years, and he is now the youngest general in the army!

It had been the custom for the 3rd and 4th Classes to visit Shoeburyness for one week in order to witness gun-practice, and this system continued until 1906. In 1907 and 1908, Golden Hill was visited instead, but after that date the visits ceased owing to the temporary reduction of the Shop course to 18 months. In 1902 a bigger scheme was started, and the last month of the summer term was spent in camp on Salisbury Plain for purposes of field training. This practical scheme was continued until 1908. The camps were run on thoroughly practical lines, horses were borrowed, one company was turned into a field battery, one into an M.I. company and the remainder into infantry companies, while bridging materials were provided for R.E. work. The experience gained was very valuable and the camps were extremely popular. Unfortunately the expense, and the curtailment in training of the units lending horses, put an end to this annual camp after 1908.

Since the war the only army training which has been financially possible has consisted of five days in camp at Aldershot at the end of the summer terms of 1922 and 1923,

The chapel.

A cadet chapel had been asked for in 1850 by Eardley-Wilmot, who felt that the dining hall, in which prayers were read, was not a place to beget reverence. It had been asked for repeatedly since that date, but money was not forthcoming, and the cadets were marched on Sundays to the Garrison Church. The Royal Regiment, too, was opposed to the idea. Its senior officers insisted that the Shop cadets were the 1st Company R.A., and as such should go to the Garrison Church. In 1901, however, Major-General F. T. Lloyd, the governor, obtained through the help of Lord Roberts, then Commander-in-chief, a grant of £5,000 for a chapel, but it was left to his successor, Major-General R. H. Jelf, to go into the plans and see the chapel built. It was dedicated in 1904. Originally the seats were on galleries on the north and south sides of the chapel, but these were subsequently removed and the chairs made to face the chancel. The east window was presented by ex-Addiscombe cadets. The eagle lectern was brought from the dining hall, and is undoubtedly very old, tradition having it that it was made from one of the old roof beams of Winchester Cathedral. By means of private subscriptions an

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organ was provided at a cost of £410, and about £900 was also spent on the screen and stalls.

In 1919, the War Memorial Window was ordered by Major-General G. H. A. White from Mr. Whall, and was completed in 1922 with the panelling containing the names of those officers who died in the war and who were ex-cadets. This Memorial cost £1,500 of which about £1,100 has been subscribed.

In 1903 the old canteen gave place to a new tea room, and the photographic rooms and sergeants mess were altered to correspond. A telephone was installed this year in the East Lodge. Khaki was coming in at this period as the result of the South African war, and cadets were issued with both khaki and full dress. In 1903 booted overalls were still worn for riding drill, but in the following year when the Duke of Connaught unveiled Queen Victoria's statue in July, the preliminary ceremonial parade and inspection was carried out in "camp dress," and review order was worn at the unveiling.

In September 1905, owing to the lack of accommodation at Sandhurst, one company of Sandhurst cadets were sent to the Shop under their own officers, but with a Shop under-officer. The establishment was thereupon increased to four companies. The Sandhurst company remained until July 1907, but returned in September 1908, and eventually left for good in December 1911. In order to provide an extra lecture room, the sand-modelling shed was converted into what has since been called Roberts' Hall. This hall in 1910 was fitted up as a dining room for the Sandhurst cadets, and an extra temporary class room (No. 10) was built. These cadets were taught on infantry lines by their own officers, but represented the Shop at games, and were considered part of the Shop.

The executive staff at this period consisted of a governor and commandant (major-general), an assistant commandant (colonel) and an adjutant. On the departure of General Jelf in 1904 the title of governor lapsed, and that of commandant was substituted. The Governor's House also became known as the Commandant's House. Colonel H. V. Cowan, R.A., was the first commandant, and he was assisted by a senior chief instructor who acted as second in command, by an adjutant and by an assistant adjutant. Colonel Cowan was succeeded in 1908 by Colonel A. Graham Thomson, R.E.

In 1908 the ground between The Shop enclosure and the Shooters Hill road, known as Jacob's Corner, was handed over to the Shop. It was War Department land, and possession of it had been striven for by General Jelf, but he had been opposed by the Woolwich gunners, who claimed it as a valuable drill ground, though in point of fact they never made use of it. On one occasion when the general took a War Office committee to see the ground, he found that the gunners had got wind of the visit, and that the whole place was alive with R.F.A.

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sections doing drill order, driving drill, laying and even manœuvre!

Once handed over it was decided to convert it into playing grounds, but the work of levelling and draining was very great because it was a quagmire in wet weather. Its inclusion in The Shop enclosure has been of the greatest advantage in the way of providing exercise for the cadets.

In 1909 the course was reduced temporarily to three terms owing to the shortage of mounted officers in the Royal Artillery, and in the following year the organization was altered to four Shop companies and one Sandhurst company.

1912 In February 1912 the organization was again altered to six companies. In September of that year, Brig.-General A. E. A. Holland became commandant and certain changes were initiated. Visits to the Arsenal ceased: cadets were divided up amongst the six companies, a proportion of each class being in each company.

In 1913 King George held his first inspection of The Shop. In this year the War office instituted the system of giving five prize cadetships to the top cadets at the entrance examination. These valuable cadetships absolved parents from all fees, though their conditions have been slightly altered since the war. The two years course also was reinstated.

1914 to 1918. At the outbreak of war in 1914, one batch of cadets had just been commissioned, another batch was passed out immediately war was declared, a third batch left in September after 12 months study, and yet another batch was sent out in November after a 9 months' course. All these batches underwent a passing out examination. For the next two years (January 1914 to February 1916), each batch was given only a six-months' course, and was not examined when passing out, their seniority depending on their order of merit at entrance.

From May 1916, onwards, a passing out examination was again instituted, and after June, 1916, the courses were gradually lengthened to nine months. They were increased to twelve months after June, 1917, to an average of eighteen months after June, 1918, and to the normal two-years course after July, 1920.

The output of cadets during the war was naturally unprecedented. By February 5th, 1916, no less than 859 cadets had passed out since the outbreak of war, and by the armistice, 1629 had been commissioned. Many gentlemen, who joined as cadets, had already seen service, and one batch of temporary officers resided in the The Shop, and received a regular course of instruction. The age for cadets was raised to 25 in 1914, and one cadet, a barrister by profession, actually was 24 years 11 months old when he entered.

During the war cadets were posted to R.E. or R.A. according to their order of merit at entrance, but after the armistice the selection of corps was decided at the end of the first year's course. The ordinary syllabus was entirely changed, and, in

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its place, was substituted a course of lectures on the practical work to be experienced in the field. The French and German instructors left, and German has not been reintroduced. Mathematics was limited to a few lectures, and the instructors in this subject assisted the map reading and artillery staff. In science, short intensive courses were held principally on electricity, explosives, field telephones, and, later, on gas warfare, wireless and sound ranging. In addition, over 1,500 officers and men from the Woolwich garrison were given special courses in science of a fortnight's duration.

During the war Roberts' Hall was converted into an additional cadets' tea-room. Three wooden structures also were put up, one as a class room (No. 11) and two as gun sheds. The guns in the old battery above the gymnasium were dismantled, and the old casemates have since been used for instructional purposes.

Brigadier-General Holland was succeeded in October, 1914, by Major-General W. F. Cleeve, and the latter was followed in June, 1918, by Major-General G. H. A. White—a temporary appointment which lasted only two years.

1919 to 1920. After the war the syllabus was gradually brought back to normal, and by the end of 1920, the usual two-years' course was progressing satisfactorily, and the old 3-company system had been reverted to. An excellent staff of officers also was collected. Four French army officers arrived in 1919, to teach French, and the former civilian instructors were dismissed, a change that has proved a great success.

The Shop has never had an officers' mess. In 1897, the top floor of I House was handed over as an ante-room, and has been used as such ever since, but the bachelor officers usually lived in pairs or in threes in houses in the neighbourhood, while a few had their meals at the R.A. Mess. In the early days of the war a table was set aside for the staff in the cadets dining hall, but, owing to the congestion in that hall, the staff were handed over towards the end of the war the seniors' billiard room as a dining room, and have continued to use it up to date. The officers quarters inside the enclosure are now for the most part occupied by bachelors.

1920 to 1923. In September, 1920, General White was succeeded as commandant by Major-General Sir Webb Gillman.

In 1921 the civilian staff were at last placed on a pensionable basis, and can in future look forward to a pension on retirement instead of to a paltry gratuity of one week's pay for every year of service.

Some of the lecture rooms and the gymnasium had been lit by electric light during the war—partly by private work and partly by government work: but by January, 1922, the whole Shop was placed on the Borough circuit. In that month Mr. W. Foord-Kelcey died after 44 years of long and valued service on the mathematical staff.

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In March, 1921, the rugger, soccer, and fencing teams of the Ecole Polytechnique visited The Shop, and a return visit to Paris was made in April, 1922. These visits laid the seeds of cordial relations between the future young officers of both the French and British artillery and engineers, and it is a matter for regret that, owing to financial stringency, they were dropped.

During the war the Shop servants' old uniform had not been kept up, and, owing to its expense and to the dislike to wearing it which the younger type of servant felt, it was changed in 1921, for a uniform resembling that worn by commissionaires.

In 1923, the workshops were enlarged, and wood-work is now carried out on the upper floor. More lathes have been obtained for metal work, and horse-shoeing has a separate room allotted to it. A new sergeants mess is nearing completion in Jacob's Corner, and, when it is completed, the old mess will be pulled down and converted into physical and electrical laboratories. Those who used to while away their time by climbing the pillars in the "stinks" (east) lecture room will learn, perhaps with regret, that these have now been removed and the roof raised, so that the presumed danger of suffocation during experiments no longer exists!

The system of bifurcation, which had of necessity been in vogue during the war, has been continued up-to-date with good results. With few exceptions, the R.E. cadets have continued to work hard, and the R.A. cadets have perforce to work hard to the end of the course, because it is by their order of merit on passing out that they have been given their choice of the branch of the Regiment they desired, and on it will depend their selection of battery in which a vacancy exists.

The syllabus is (December 1923) briefly as follows :—

Artillery—Gunnery. 18-pr. and 6-inch howitzer drill.

Engineering—Manual of Field Works as far as formed trestle bridges and pontoon bridges. Geometrical drawing.

The digging field was handed over to the Woolwich Garrison in 1923, and the Repository grounds taken over instead for all practical M.E. work.

Tactical work is based on the application of Field Service Regulations. Tactics, map reading and field sketching, administration, and military law are now all under one chief instructor. More time is given to map reading than to map making. Elementary survey work was added in 1923.

The Mathematical course was radically altered in 1903 and made more practical than academic.

1st year—Dynamics, elements of ballistics Voluntary calculus.

2nd year (R.E. cadets only)—Applied mechanics, strength of materials. Calculus.

The Science syllabus was evolved during the war, and is intended to give a good foundation of theory on which future

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knowledge can be based, and at the same time a practical knowledge of military scientific instruments.

The workshops course, which has been obligatory since 1902, comprises wood-work—simple joints and the use of simple tools; metal work—the use of the vice and the lathe; horse-shoeing—the method of making and fitting shoes, and the diseases of the foot; and internal combustion engines with some lorry driving.

Riding, infantry drill, physical training, French, and sanitation are also taught. Freehand drawing ceased in 1900.

The future. Is is risky to prophecy as to the future, but it appears probable that from September, 1924, the course will be reduced permanently to eighteen months, and that the lower age at entry will be raised to eighteen years commencing with the examination in June, 1925, the higher limit of age remaining at 19. Bifurcation will cease, and all cadets will undergo the same course and be posted to R.E. or R.A. at the end of their course according to their order of merit and their wishes. After passing out the R.A. cadets will be sent on commissioning to the School of Artillery, Larkhill, for a practical course of three months prior to joining their batteries: R.E. cadets will have about $2\frac{1}{2}$ years training, two of which will be spent at Cambridge, and the remainder at Chatham.

If these innovations are authorised, the 3rd term cadets in December, 1925, would go to Cambridge and Larkhill, while the 4th term cadets would be sent to Chatham or to batteries as at present. A double lot would be passed out.

It is considered that a practical course for young R.A. officers prior to joining a battery will benefit them very greatly, and that the R.E. will also benefit by being sent to Cambridge. At that University the laboratories are, probably, the best in the United Kingdom, and a large amount of money is available for providing a thoroughly up-to-date engineering education. At the end of his two years, each R.E. officer will be expected to obtain an engineering degree, and will thus ensure his being as highly trained as his civilian confrères.

It may be of interest to note that the present post war requirements of the Regiment and the Corps are estimated at 35 and 22 respectively each half-year.

Games and sports have been of gradual growth.

Games. Cricket of a sort was played prior to 1850 but there are no records extant. The grounds on either side of the old entrance drive were each only about 90 yards square, and boundary hits over the ha-ha were frequent. Matters improved after 1877, though most matches were played in the R.A. Barrack field up till 1886. The first match against Sandhurst took place in 1865 at Lords. The Shop colours were invented in 1867 by substituting blue for red in the I Zingari colours. The cricket pavilion was built in 1896.

The first athletic sports were held in 1850, and in 1899 a Jubilee Bugle race was one of the events of the sports of that year. The first inter-sports against Sandhurst took place in 1868.

Rugby football was started in 1862 and the first match against Sandhurst was held in 1865.

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Association football was started in 1880 under difficulties, and games had to be played on the Common. The first match again Sandhurst was played in 1888, and in the following year representative colours were given for the game in place of the former pink and chocolate.

The first racket match against Sandhurst took place in 1879. Owing to the few cadets now playing the game the east racket court was converted into three squash racket courts in 1923.

Hockey became a recognized game in 1900, when the first match against Sandhurst was played.

In gymnastics the first competition for the shield presented by the National Physical Association took place in 1888. After the South African war physical exercises gradually replaced pure gymnastics, but the competitions up to 1914 still contained exercises on the parallel and horizontal bars. These ceased after the Great War, and the cadets tables in use to-day are brain stimulating exercises, and include in addition elementary boxing, swimming and basket ball. Voluntary work includes foil, sabre, epée, bayonet fencing and advanced boxing.

The first fencing contest against Sandhurst took place in 1910, and boxing in 1895.

A revolver shooting competition with Sandhurst began in 1892, but ceased after 1914.

Lawn tennis and swimming contests against Sandhurst have not yet been recognized.

In 1888 the ground just south of and above the gymnasium was begun to be levelled as grounds for rugger and soccer, but the drainage produced exceptional difficulties, and, though some games were played on them from 1895 onwards, it was not until 1907 that they were used at all regularly, and then but little after Xmas as they then were generally unplayable, and matches had to be played in Charlton Park.

The swimming bath was commenced in 1889, and after some trials eventually held water in 1893.

Though work began on the Jacob's Corner grounds in 1908, it was not till 1911 that the first rugger game was played there, and the soccer ground was not ready till the following year. By the end of the War four new grounds and a cinder running track had been completed, and a pitch for 2nd XI. cricket matches had also been made. The first sports were held on the cinder track in 1919.

With the completion of these grounds, The Shop now possesses, two cricket, two rugger, two soccer, and two hockey grounds, a cinder running track, twelve lawn tennis courts, of which four are red, one racket court, 1 stické court and 5 squash racket courts.

Tradition.

Many of the old customs remain: details alter, but the principles are the same. Snookers are taught to realise that they are the junior term, and must submit to the discipline of their seniors, but the methods now in use do not savour of the horse play of a generation ago. Their bowler hats perished in the great war, and caps are now a more lasting substitute until uniforms

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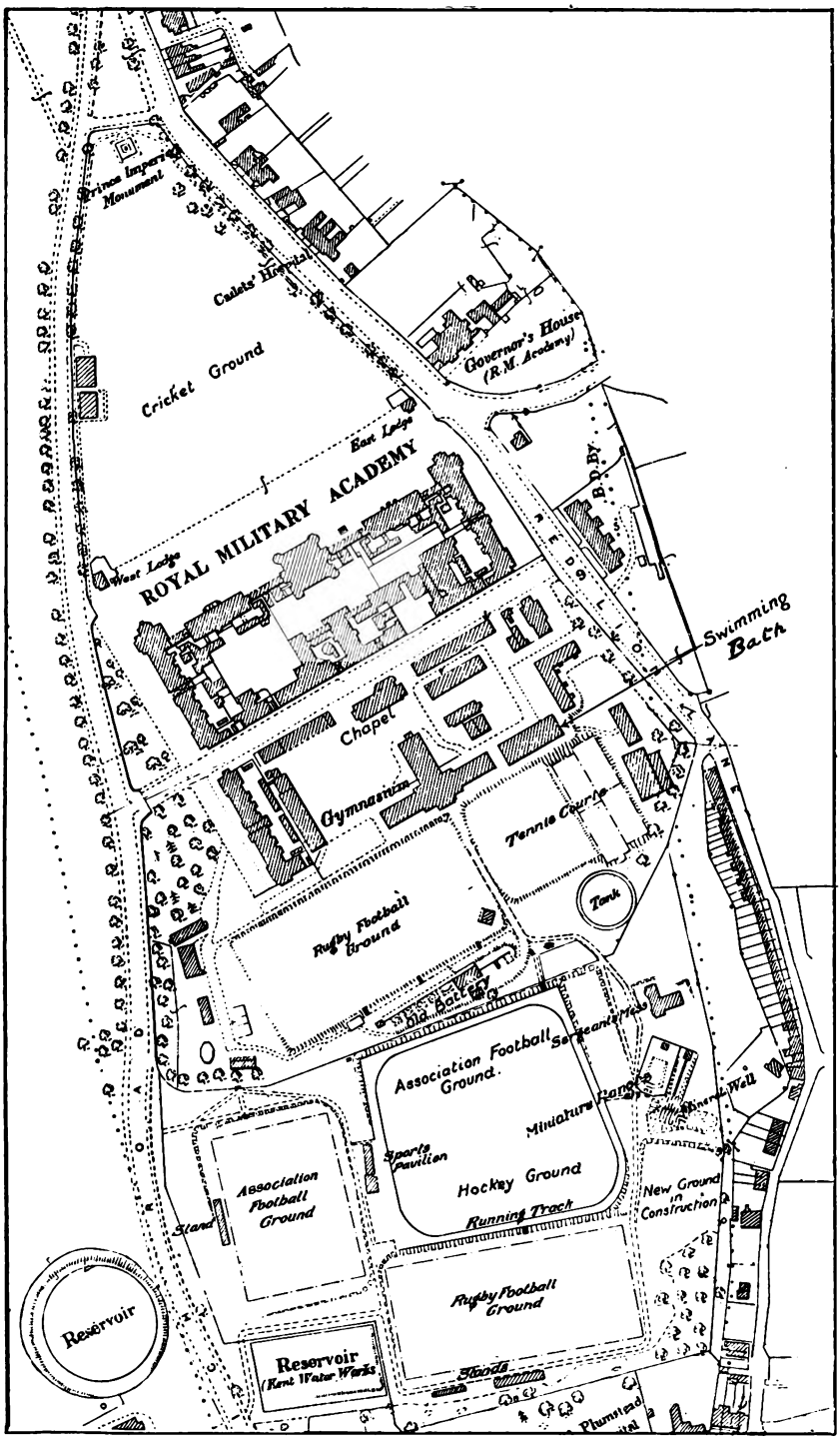

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are ready. Their sing-songs during their first term have been replaced by an entertainment of sorts given on the gymnasium stage, at which the staff are present.

Week end leave to friends accredited by parents still continues. It is not abused by the cadets, and but rarely by the friends.

During the six-company organization before the war, the old system of making all the senior term into corporals was changed, and only about half were made non-commissioned officers—sergeants, corporals and lance-corporals. After the war the old idea prevailed that it was desirable to give every senior, who was worthy of it, a stripe so as to develop the power of responsibility and of command, and the 12 best cadets, after the under-officers, are now made sergeants, the remainder being corporals and lance-corporals.

Last, and by no means least, the good tradition of The Shop is upheld by all who join it, and "Shop spirit" has never been stronger.

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SOLDIERING IN INDIA TO-DAY.

BY MAJOR-GENL. SIR G. F. MacMUNN, K.C.B., K.C.S.I., D.S.O.

THE Secretary has asked me if I could contribute some notes on soldiering in India to-day, for this anniversary number. Unfortunately his letter has reached me late and I have little time to compile anything more than some rough notes that may be of interest to the Regiment. My recent years in India have kept me somewhat away from every day regimental life, but I hope that the notes below may be of some general interest.

I am often asked by those who have left the Shiny some years ago, if things are changed, and I must say that so far as cantonment life goes I don't think things have changed very greatly. The army in its cantonments is a thing apart and except that there are more individual civil officers who are Indians in the civil lines and to be met in clubs, the changing life of India will not strike the soldier much. As we have begun with amenities it will be well to exhaust that subject. Cantonments are much as ever, the Messes have recovered to a great extent the deterioration, in some cases disgraceful deterioration that took place during the war. It was a grave mistake on the part of those responsible for the administration of the R.A. Messes Fund, that the Quartermaster General was not at once moved on the outbreak of war to have them and their property put into the inventoried care of the Barrack Department. A word here about the regimental property. In certain messes there are most interesting and valuable pieces of plate, pictures, even articles bearing the inscriptions of the H.E.I. Company's Artillery, and in some messes these are not looked after, unless recently the Colonel Commandants of the Commands have made it their business to call for the inventory and see the property at times. I remember a hearty young officer sending most valuable Sheffield plate candelabra into practice camp tied atop of a bullock gharry.

A former subaltern of mine now commanding a battery, tells me that his subalterns with the increased post war pay are about as well off relatively as he was when a subaltern in the same station, or a trifle better and can get along comfortably. But the rise in prices, due very largely to the war, is undoubtedly the chief adverse feature in present conditions. No one is passing rich now, whatever their pay. Twenty years ago a major of artillery was comfortably situated even with a wife and family. Now he is by no means so, the junior ranks if married are in a really difficult situation. Also the art of economy has been lost. All the world is more expensive in its ways though the fact that the world has poured its riches into a bottomless

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pit during the war, should have produced a period of straightened living.

Young officers fling themselves on motor bikes and hasten off to dance of evenings, a habit that thirty years ago might have led to the prickly pear hedge at two in the morning of a guest night. Many folk have cars, and the humblest car costs money. Sport is expensive because coolies, conveyances and ammunition are expensive. Cars carry folk far afield and those who have them often get more to shoot but the cost of a day's sport is considerable. The cost of a Kashmir shoot is great, but possible to ardent spirits who study economy.

Polo is a difficult proposition. The price of ponies and their keep are much increased. There is no doubt that His Majesty's Government does not calculate on polo playing in fixing the salary of officers and does not intend them to play the rich man's game as part of their rule of life. That most famous of gunners Sir Lawrence Parsons, who has recently left us, always declared that polo was doing the regiment harm in India and spoiling the character of the officer. He maintained that it kept him to the four squares of a dusty cantonment rather than riding the country side after pig, or with a sais and a scattergun behind him looking for small game and learning the country side and the people and the ways of nature. He also knew that many men took years to recover from the cost of trying to play polo. At any rate those who cannot afford to play should not be afraid to say so and they can very well take their sport in the older way. With a section of horses at his disposal, a subaltern of artillery should find that the country side is his. There is immense interest and romance in the country side even within the ten mile radius of an Indian station. He need not be afraid to taking his own line and it is only where the snobbery of polo prevails that anyone will think the worse of him, and that does not matter.

To assist polo players of small means, however, Lord Rawlinson has obtained sanction from the Government of India for officers of mounted services to play regimental animals of suitable size, provided that the commanding officers are responsible for fair treatment, and that a monthly wear-and-tear fee is duly paid. This does not help the gunner very much and the Quartermaster General's department have been considering the possibility of issuing a lighter type and a smaller horse as battery rides, so that there may be a few polo horses available. Unfortunately recent reductions of artillery have thrown a number of large horses surplus on to the Remount Department's hands, and these have got to be absorbed before any lighter horses can be bought. The "boarded out horse," however, is a possible assistance for polo. Under this an officer in possession of his authorised number of chargers, may have as many cavalry horses as he likes from Indian cavalry regiments as boarders. He must pay the fee which covers wear-and-tear but is small, and he must of course feed them. If he can get suitable ones, however, he will save any capital outlay. The small waler issued to Indian cavalry often makes an excellent polo pony.

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Chargers.

From time immemorial the Indian Government have refused to provide as in the United Kingdom free 'military purpose' chargers for mounted officers. The justice of this is doubtful, but since 1921, forage is issued and sais allowance of Rs 15 per charger is given in lieu of the inadequate Rs 30 per mensem of pre-war days. Line gear is also provided free and Government have undertaken to provide officers saddlery. Extreme financial stringency has prevented the saddlery being fully provided yet though progress is being made. Chargers, however, may be bought from the Remount Department at what are really concession rates viz., Rs 600 for subalterns and captains, Rs 800 for majors and lieut.-colonels. The higher rate is less than half the cost to Government. Officers in the north of India wanting chargers, are advised to try country-breds from the two big young horse depôts in the Chenab canal colony, at Mona and Sarghoda. Scientific horse breeding on a scheme which has not been tinkered with, has been in progress for 24 years now, and horses three-parts English or three-parts Arab can be obtained at any height from 15 to 16 hands. They are really high grade horses and turn out very successfully. There is no reason why they should not be as staunch to pig as walers. Concession chargers are paid for by 36 monthly instalments if the officer so wishes. There are certain conditions attached to their sale, as Government cannot be expected to allow an officer to buy a concession horse and sell at a large profit to outside purchasers.

Bungalows and quarters.

The house accommodation question has been acute since the war in many stations especially in upper India. The reduction of the army however, and certain measures of relief have eased matters a good deal. Government except in the hills at Quetta, and one or two special stations have never provided officers quarters. In old days officers borrowed money on mortgage and built their own house in a station, letting on rent to others or selling when they left the station. Thus houses gradually got into the hands of Parsee shopkeepers, etc., or Indians having the Mohammedan prejudice against investment as a form of usury would use their money to build bungalows, not considering rent in the light of interest.

The bungalow owner fell on evil times with the war and the rise of the cost of repairs. He also found that restrictions were placed on his rent compared with house owners in civil lines. As a result of representation Government have passed a revised 'House Accommodation Act.' Under this a landlord may jump his rent as he likes. But to save the officer's pocket, the G.O.C. the District, may acquire the house on long lease for Government and it then becomes a Government quarter, allotable to officers under the rules for such quarters. An arbitration court settles the rent that Government must pay on a repairing lease, but the military tenant will only be called on to pay the actual rent subject to a maximum of 10% of his pay, or 5% for a batchelor quarter. Government lose the difference if any, and face the possibility of an empty house. This is a much

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fairer rule both for landlord and officer, but will not of course operate at all where relations between landlord and tenant are still satisfactory.

In other large stations Government have built batchelor quarters in, or close to mess compounds, buying the messes first if need be. This relieves the strain on bungalows, leaving more for married people. At certain crowded stations military hotels have been built, known as "Army Mansions"; Quetta, Mian Mir, Peshawar and Kohat. More may be built later. These hotels are managed by the Indian Army Canteen Board, and an officer and his wife live exceedingly well for a little over Rs 400. The quarters consist of single suites of a room, dressing and bath-room each and a married couple get two suites, or more if the local military authority who allot the quarters consider the size of the family demand it.

Alas, the cost is too high to help the married subaltern, but aims at giving first class English hotel food. The married subaltern of little or no private means, cannot be helped by the state and must double up in a bungalow and live in tents and on curry *bhat* till times are better. The Army Mansions cater chiefly for married captains and majors who find it difficult or inconvenient to set up house, and for unmarried officers who do not belong to a regimental mess. The dining rooms, etc., are on good hotel lines, while a beneficent Government has ministered to the ruling passion by adding a dancing floor.

Travelling.

The cost of travelling is high, and comes heavy on those who travel for sport or who move their families to the hills. The cost of railways has much increased with the general level of prices, and fares have had to go up too. Travelling allowances are meagre, but as they go by fares, and a portion of a fare is given in excess to cover miscellaneous expenses, the rise in fares has improved matters for duty journeys. Government have under consideration the application of civil rules to military officers. This will give a better allowance of baggage for permanent moves, and a better halting allowance. Sea passages are a difficulty for those on leave home. The general and continued moves, changes, and reductions after the war are still in progress. This means that all troopships are filled with duty passengers and old "indulgence" passages, the filling up of otherwise empty births with junior officers and their families proceeding to England, are few and far between. This will improve as the army becomes normal, but for the last four years the lack of such passages has pressed hard on officers. Perhaps the greatest change in travelling in India for the worse so far as comfort is concerned is the large number of Indians who now travel first class with their families, which means that the trains certainly the mail trains are always crowded.

General.

The above finishes off the general tale of the amenities, and I am afraid that in spite of alleviations here and there, the expense of living has taken much of the charm off military life in India, especi-

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ally for married men though some of this is due to our more expensive ways of living. The great rise in servants wages is due to the cost of food, and especially the cost of cotton, also to the fact that their standard of life has risen.

Food prices are falling, and employers can perhaps gradually insist on lowering the wages somewhat. But the '*bachit*,' the amount that a servant has over to send to his home is less in value than pre-war. The rise has benefited him little. Allusion should be made here to the Government concessions, allowing the purchase from ration stands of any ration article, and from the Ordnance either direct, or in case of regimental officers through the quartermaster's stores, of any ordinary articles. This applies to blankets, warm clothing, pails, lanterns, stable-gear, etc., and at times these concessions are most advantageous. Officers rarely find out all they are entitled to. A well-known Yorkshireman in the regiment once told me that whenever he went to a new station or country, he at once studied the allowance regulations and other rules that applied, and always with substantial advantage.

A word as regards dress may be of interest. There are only three orders of dress in India for officers. Service dress khaki drill, mess dress cloth, and mess dress white. The drill for all ranks and all services is now of the greeny shade known as "Stockport No. 1," which is infinitely neater in the ranks than the old brownish shade, and matches better shirts and ties that go with service dress. It is best obtainable from the Ordnance in India where it is manufactured. Service dress jackets may be worn in the winter, when the men wear service dress, but is not obligatory. The drill jacket is the only obligatory jacket. The blue serge is not a recognized dress. Cloth mess dress may be worn with white waistcoat or kummerbund at regimental discretion. White mess dress has a rolled collar and is exacted the same as the cloth jacket. White drill except as mess dress is not now worn. The only difference between drill order and review order is the wearing of medals and decorations by regimental ranks only. Shorts, open shirts, hotie with shoulder straps and belt are official hot weather uniform, which robs an Indian summer of most of its horror.

As Quartermaster General of the Army I have largely to do with army housekeeping and therefore I have dwelt on these matters at some length. I will now say something as regards the new points in organization other than armaments.

The brigades and batteries.

One of the chief changes from pre-war days is the substitution of Indian for British drivers in all save the firing battery. As will be realized this has produced a very considerable economy, and great trouble is now being taken to get a good type of soldier. The Indian drivers are becoming very efficient in those batteries where they have been sympathetically handled. It will well pay officers getting to understand these men. With the batteries are also an Indian officer, and this gives gunner officers a good opportunity to get to understand the Indian soldier whose good qualities they will soon appreciate. No

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men respond more to interest and sympathy. Pre-war, it will be remembered that there were only a few inferior Indians who drove in the forge and store wagons, except in the ammunition columns. Good barracks have at last been erected for the Indian drivers.

In the pre-mutiny days, there were native field and horse batteries and the European batteries had only European gunners. In the Bengal Horse Artillery it will be remembered that the gunners drove, riding both ride and hand horses, and that lascars who rode on the axletree seats, held the horses in action, all except the lead driver who stayed mounted. The gunner who drove the lead was always a bombardier, so that Kipling writing

"Down in the lead with the wheel at the flog
Turns the bold Bombardier to a little whipped dog"

knew what he was talking about and was not merely making his lines scan. "Snarleyow," was a horse in the 2nd troop first brigade Bengal Horse Artillery (it was his actual name), and the incident of the disembowelling, and of the drivers brother occurred in that troop at the battle of Ferozeshah in the Sutlej campaign. Lord Gough's Artillery was mostly horse artillery, and was being blown off the field [illegible] ordered to

Erratum

Page 507, line 24. For "discretion" read "digression."

tractor with some of the new light tractors.
perhaps be long regretted, but an old soldier may still shed a tear for the elephants and wonder whether a tractor can apply its weight as wisely as a *hathi*, when next the "forty-pounder train" jam in the gorges of Afghanistan.

In the mountain artillery, for whom the new name pack, is a sad substitute, even when one can appreciate the reason for it, a change is the mingling of British and Indian batteries in the same brigades. This brought forward the question of pay and the fact that officers R.A. cannot be ordered to serve with the Indian batteries. The old way was to get volunteers and perhaps compensate for the long periods in out of the way stations by extra pay. When Indian batteries serve in Jutogh and the Gullies, this disability has perhaps gone, but the question of liability still remains.

The battery horse.

The horsing of the artillery in India is not yet up to pre-war standard, because when the whole world was denuded of artillery animals during the war, many a tall ramshackle horse had to be bought as the war ran on. Government cannot afford to cast those that are good enough, nor even if it would, could enough horses of good type be obtained all at once. Matters are improving of course every year. With every sympathy with the battery commander who has had a poor lot, I have had to harden my heart against special castings. Most of the columns have those magnificent mules from the

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Mississippi which were bought at the commencement of the war and which General John Hotham took such a special interest in. Many of them have drifted to India from Mesopotamia, where they were invaluable. As they die out it is hoped to get some more from Australia, where it is believed, a hitherto neglected mule business may be developed. (The reduction of heavy horses has compelled us to utilize the horses for which there is no market in India, to horse for the time one of the ammunition columns).

This may equally apply to ordnance mules for pack batteries. The country bred mule breeding does not produce enough for the much larger number of pack batteries now required. At present, the balance come from the United States, whence about 300 a year are imported. Trans border trade pack demands have resulted of late years in mules being sold away by breeders long before they are mature, and the only locally produced ordnance mules are those bought from the breeding colonies as yearlings and run and fed to get them big. I have noticed however, that the presence of the 15 to 16 hand Mississippi mules in the country have rather spoilt the pack artilleryman's eye. He insensibly looks for mules that are too big. War never requires the climbing feats of a day's hill parade, and in any case the short stubby mule about 14·1—14·2 is what is wanted. The batteries like the field batteries have on hand a certain number of inferior war time products not bad enough to be cast. The Punjabi bred mule from the studs cannot be bettered, and the American mule if not too big is always satisfactory.

The Rank and File.

I have referred to the Indianization of the driver ranks, in the field and horse artillery, which of course was always a feature in the British pack artillery. The British barracks of India are the same as ever; some improvements are being made in washing arrangements, and dining-rooms, where not existent, will have to wait till Indian finances improve. But the British barracks in India for many years have been good in their old fashioned way.

Institutes are poor compared with Home, and surplus canteen funds have not been available. A canteen board, the "Army Canteen Board, India," under the Companies Act has been started and is functioning in the Rawal Pindi, Peshawar, Kohat, Waziristan and Baluchistan districts. It has chiefly been started so that in the next war there may be an organization in being, since in Mesopotamia, till the War Office sent canteens and in the Afghan war of 1919, all arrangements broke down badly. Good army contractors in India can be very good and are more popular with commanding officers than the Board, and can in many ways do more than the Board. At the same time the Board has come to stay, and will probably extend further into India. As it pays off the expenses of formation, it will produce a profit for distribution to the army over and above the monthly rebate which it of course pays out at once. Its institution has tremendously stimulated contractors in other parts of India, to give their best, while the Board itself is stimulated by the existence of competing contractors. In due course it should develop into a proper army co-operative society. Its primary reason however,

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is the necessity for a war organization, and the fact that at the end of the war the army contractor was giving extraordinary bad stuff to the troops.

Electrification of barracks is steadily proceeding and most hospitals and barracks in the worse stations such as Peshawar are lighted and have fans. Cinemas flourish in most stations, and on the frontier are being provided by the Board. Recreation grounds have been improved all over India, and the men are well catered for in this respect. The actual institutes other than the actual sales-bars are managed by the district institutes board, instituted in Lord Kitchener's time. It is probable that before long, Government will improve the fittings and in areas where the Army Canteen Board, India, functions, will hand them over in good order to the Board to maintain, as at home.

Conclusion.

I am away from data, so have not touched on armaments and armament policy which are pretty well known. Speaking generally, it is up-to-date and modern in spirit, or soon will be in every particular. Practice camps are modern and are improving in appliances, while the Air Force co-operation is properly developed. The R.A. equitation school started at Umballa after the war, could not stand the financial stringency, and could not be called an absolute essential. A certain number of R.A. officers go to the Cavalry school at Saugor, which I think now has a more general name. As people probably know, this school is in the old artillery lines which in themselves were once the lines of the Madras Artillery at that station.

From what I have seen of the post war batteries, I should say they are steadily returning to the old state of the Regiment and will even surpass it, quite apart from their efficient modern training. As the old "numbers one" are being recreated and the old tradition is revived, the spirit will be even finer than in the days of yore and that is saying a good deal. The batteries that I saw turn out for the Prince of Wales, would have competed in turn-out of men, equipment and horses with anything in days gone by. "For that which has been is that which shall be, and there is no new thing under the sun."

In fine, India is still there, the great open countryside, the rolling plains, the snipe jheel, and the patch of grass, that holds black partridge. The doon and the mahseer stream, and the Persian wheel that drones out mystery and romance of the east, which is still there for those who feel it. Ruined cities, ancient towers, and hill forts, and the tigers lair are there and all the romance that ever was. The fact remains that some natures never like India and to others it will appeal all day and every day, and to many the more as they grow older. As the world settles down in peace, the frontier with its hint of war and its raw bare hills and its bitter winter, will always appeal to the soldier, chatter the parliaments never so wisely. Antiquity, history, archaeology, ancient architecture, "the loose loves carved on the temple walls, a ruined fane and a rusty sword" are still there, and I certainly would still send sons of mine to India to the care of what Kipling has called—"The grim step-mother of our kind."

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THE ROYAL ARTILLERY WAR COMMEMORATION FUND.

BY BRIG.-GENERAL F. T. RAVENHILL, C.M.G., R.A., (RETIRED).

EARLY in August 1918, a happy inspiration on the part of someone—possibly Colonel Arthur Young, C.M.G.—brought together a party of artillery officers to an informal meeting at the Horse Guards, Whitehall, with a view to putting into concrete shape :—

> "The general feeling among all ranks of the Royal Regiment of Artillery that their comradeship during the Great War should be commemorated by the establishment of a memorial on a scale worthy of the part played by the Artillery in the War and of the traditions of the Royal Regiment, and as a lasting memorial to all ranks who have given their lives for their Country."

A Central Committee with power to add to its numbers—truly representative of all branches and ranks of the Regiment—was formed forthwith and proceeded to business. The late General Sir Henry Sclater, G.C.B., G.B.E., was appointed chairman—a fact which testifies in itself to the broadminded and thorough manner in which the administration of the fund was to be carried out.

Donations from the Regiment were invited for two objects :—

(1) A benevolent scheme.
(2) To erect a permanent memorial worthy of the Regiment in London.

From the earmarking of donations it was soon apparent that the bulk of the money was to be applied to the Benevolent Scheme. No grander idea could have been devised for commemorating the services of all ranks who gave their lives for King and Country, than that of caring for the wants of those whom they had left behind. Nor could a more practical scheme of commemorating the comradeship of the Great War have been found than that of banding together and working for the good of those who have been, are, or may in the future be, in the Royal Artillery.

The Benevolent Scheme comprises :—

(1) Relief in distress.
(2) Financial assistance with education.
(3) An employment department.

In March, 1919, letters were sent to the next-of-kin of all those who had lost their breadwinners in the field, informing them where to apply in the case of need. It is impossible in any such brief article

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as this, to give details or even specimens of the thousands of applications with which the Fund has had to deal. Suffice it to say, that thanks to the generosity of their comrades, numbers of widows, orphans, and dependents of artillerymen, who laid down their lives in the cause of right (and many a man who had suffered owing to the war), have been able to obtain much needed help.

From the earliest days the fund has worked in the closest touch with other charitable organizations in every part of the British Isles—thereby securing uniformity of administration, maximum of benefit, and avoiding overlap in any sense or form. The Regiment owes deep gratitude to the majority of County and other Welfare Societies started after the war in our great cities, as well as to the Soldiers' and Sailors' Help Society, the Soldiers' Sailors' and Airmens' Families Association, the British Legion, the United Services Fund, and many other Benevolent Societies for their invaluable help and co-operation.

The Education Scheme started in July, 1919, has proved an unqualified success. The sum set aside each year for this purpose, provides assistance for three or four times the number of children who could have been accommodated in a regimental school—the foundation of which would have meant that the whole sum subscribed had to be assigned to the one object—there would have been nothing available for relief or employment. In making their awards, the factor which carries most weight with the Education Sub-Committee, is that the need for assistance shall be directly due to the Great War; and the object aimed at, is that as far as possible children shall receive at least as good an education as they would have done had there been no war.

Undoubtedly the greatest problem which the Fund has had to face is finding work for our unemployed. No stone is left unturned to overcome this great difficulty. A few devoted whole-time canvassers in the Metropolis, over 700 Gunner Friends in every part of the British Empire, and 30 to 40 local branches of the Artillery Association, are all using their influence to keep alive the interests of the Regiment in whatever part of the country they chance to be.

Those who realise that this service is carried on in the spirit of comradeship, and that Ubique is our motto in peace as in war, say without fear of contradiction that "every Artilleryman can be a Gunner Friend".

During the present winter many big schemes are contemplated on railways, roads, docks, etc.—it behoves every one of us—past and present members of the Regiment—to see if we cannot secure employment for even one man in one or other of these undertakings, and so help to alleviate the unparalleled distress in the country.

It may be remarked that in round figures £180,000 has been received by the Fund—and at the present time the balance credit stands at approximately £145,000 which however, includes £17,000 of the £25,000 which is earmarked for the Memorial itself. Those who wish to see a more detailed statement of the accounts and a summary of the work done, should apply to the Secretary, for a copy of the Annual Report.

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Since it was stipulated by subscribers that capital as well as interest, should be gradually expended, the life of the R.A. War Commemoration Fund is limited—but the work once started should not be allowed to die out in our time or in fact in any time. The Royal Artillery Association—formed under the aegis of the R.A.W.C.F.—is growing steadily, and will if supported by all who profess comradeship, be in a position to carry on the invaluable work of the R.A.W.C.F. when that fund ceases to function.

Between March, 1919, and December, 1923, over 7,800 cases have been assisted by the Sub-Committee of Enquiry and Relief, some 600 children have been given financial assistance with education, and about 3,000 men were found work during the period.

A description of the permanent Memorial with a photo and plan of the site is given in the Annual Reports for 1922 and 1923.

Mr. Jagger the sculptor has the work well in hand. One, and perhaps two, of the huge (8′ 6″) bronze figures which will be on the pedestal are practically finished and if accepted will be on view at the Royal Academy, 1924. The contract time for completing the memorial is July, 1925, but it will in all probability be ready for unveiling before that date. A "magnum opus" of this nature necessarily takes time to develop and consequently the Central Committee has purposely allowed the sculptor ample time to produce a memorial on a scale worthy of the part played by the Artillery in the War and as a lasting memorial to all ranks who gave their lives for King and Country.

Many persons have portrayed with brush and pen a pleasing record of those of the Regiment who fell while serving the guns, but we who are left can best give our testimony to work nobly done by helping those of our less fortunate brothers and sisters who are in trouble. When it is called to mind that the greater part of the 800,000 of all ranks, who passed through the Royal Regiment of Artillery between August 1914 and November 1918, are still amongst us, and are to-day to be found in every part of the globe, we may safely say that we have an unique opportunity of proving and consolidating the comradeship we found in the trenches.

In the hunting field, at the covert side, on the golf links, at football matches and at the numerous social gatherings that take place throughout the winter, there must be unexpected opportunities of hearing of work which should not be missed. Any extra effort entailed by a note-book or memory record of the job waiting to be filled, is amply repaid by the cheerful thought of having secured employment for some ex-artilleryman.

Rudyard Kipling in his story of "Little Foxes—a tale of the Gihon Hunt"—describes how business can be combined with sport.

General Sir H. M. Leslie Rundle, G.C.B., G.C.M.G., G.C.V.O., D.S.O., Colonel Commandant Royal Artillery, has succeeded the late General Sir Henry Sclater as President and Chairman of the Central and Executive Committees, an appointment which speaks for itself.

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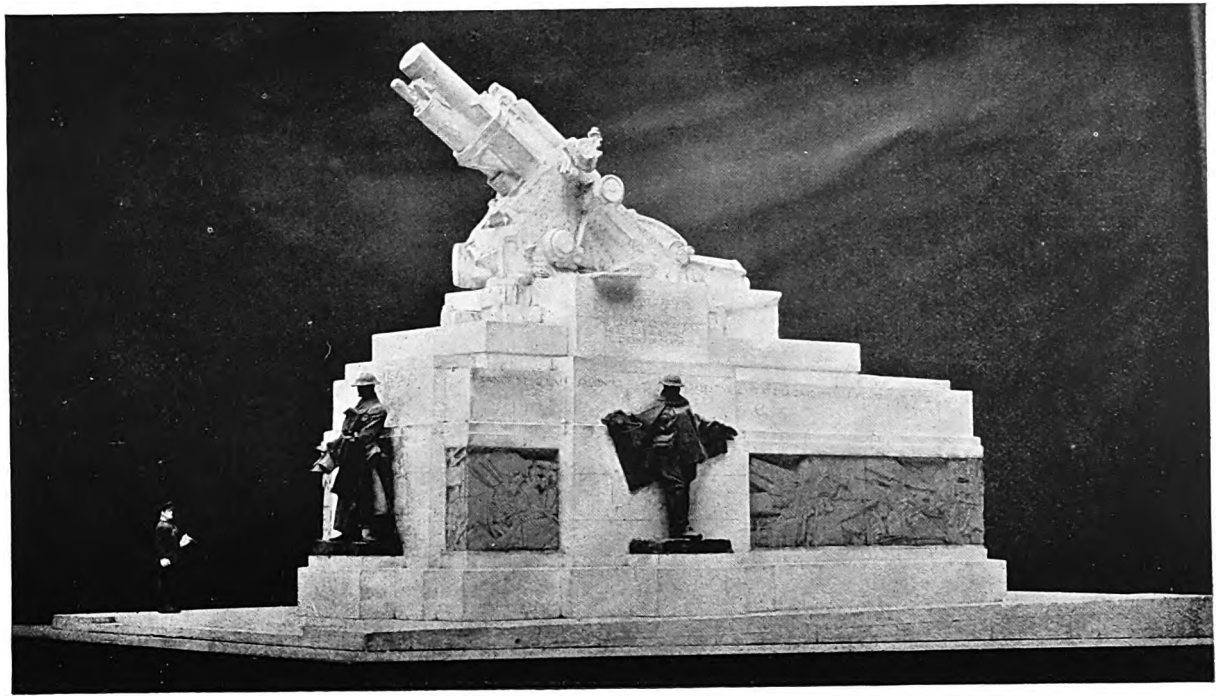

Photo of the Model of the Royal Artillery War Memorial.

The lettering as shewn is to be modified. The figure on the step gives an idea of the comparative size of the Memorial to a human being.

A model of a Gunner carrying ammunition will be placed on the East side of the pedestal of the Memorial.

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FOX HUNTING.

By BRIG.-GENL. J. E. C. LIVINGSTONE-LEARMONTH,

C.M.G., D.S.O., R.A. (RETD.).

Illustrations by Capt. Gilbert Holiday.

"Now where are all your sorrows, and your cares, ye gloomy souls! or where your pains and aches, ye complaining ones! one halloo has dispelled them all."

IT may appear somewhat hackneyed to head an article on the subject of hunting with a quotation from Beckford, but the writer will make no apology for doing so.

The effort of attempting to put one's thoughts and recollections on paper in an editorial manner, without the pen of a ready writer, is already too great, so I must relapse into the first person, quoting again from Beckford: "This however, I must desire to be first understood between us; that when, to save trouble to us both, I say a thing is, without tacking a salvo to the tail of it, such as, in my opinion, etc., you shall not call my humility in question, as the assertion is not meant to be mathematically certain."

It must be admitted that Beckford got off with a wonderful start, his "Thoughts on Hunting" was apparently the first text book on the subject published, but still remains the standard work 143 years later; few books can stand this test. The unwilling schoolboy (a keen hunter no doubt) might compare Virgil's effort on bees with Maeterlinck.

I was bred within a mile of Peter's kennels, whose picture in hunting kit, a green coat and white collar, looked down on me at my meals (other than those in the nursery) and one of my earliest recollections was falling through the ice on Peter's lake and getting out with some difficulty.

It is regretted that in these notes I cannot give any impressions of hunting the stag or hare, having had little experience of either.

One effort to hunt a carted deer sticks in my mind. On Patrick's Day in 1898 it was reported that the Fethard harriers would hunt a deer, the meet being at D'Arcy's Cross. The deer was said to have been first led, then hunted with terriers, over the fine banks in that part of Tipperary and rewarded at the end of these trials with such a feed of oats that he would take us at top speed to his home.

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We all turned out to see the fun, but it was a miserable fiasco; my diary records that we took the deer in eight minutes. To save the day that well known sportsman Willie Hanley started off with a drag, but although the hounds were said to hunt anything from a cat in a kitchen upwards, they would not own to the line.

I expect the essence used to produce a scent was somewhat crude, and no doubt our old friend Guest, of the Woolwich Drag, would have found something better. Let me recommend the dirtiest possible litter from a ferret's hutch, if a drag is required at short notice, it is usually obtainable and even a lap dog cannot resist running the line.

I have always wanted to see the West Country stag hounds at work, having been told, amongst other things, that it is part of one's education to see the way in which hounds can be stopped from fresh deer by a rate from the top of a big coombe, a finesse quite impossible when fresh foxes are on foot. We must of course remember that the scent of a hunted fox diminishes as the hunt goes on, whilst that of a deer, sweating through his skin, increases.

Surtees truly says that "many people prefer finding fault to praising. They think it shows acuteness on their part."

It is a pity that most of the people who criticise are so ignorant and yet so anxious to throw their tongues.

Any man who undertakes the arduous duties of M.F.H. is a philanthropist of the highest order, and it is to be regretted that a very large proportion of those who have the pleasure of hunting with his hounds do not realise their debt.

We must accept the Master's programme without question, even for example, if it entails a prolonged dig, when we in our arrogance pronounce it to be a good scenting day, and remember that it has always been considered the worst of form to criticise another man's servant, a convention more honoured in the breach than in the observance when huntsmen and whips are concerned.

We are too apt to class our sport according to our ride and hounds are seldom considered. In this connection I received a well merited but kindly administered reproof from the late (2nd) Lord Portman, who was M.F.H. from 1858-1919. I happened to say we had a bad day, but he said we went out to kill a fox fairly with hounds, we had done so; the fox had not been mobbed, chopped or dug out, so hounds and huntsmen had done their task although we did not have the ride we hoped for.

The country in which the stranger is permitted to hunt is often condemned or it is said that wire makes it impossible to ride to hounds; such comments should be left to the permanent residents of the country. A good fox makes any country good, in the absence of the principal performer no country is of any value and it must be taken for granted that the residents do all in their power to get the wire down; it is very galling to one who has spent much time, trouble and expense trying to get it down to hear some ignoramus say "I wonder they don't try to get the wire down." A scarlet coat often covers a vast of ignorance. It is the residents who do the "summer

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hunting," meeting those who live all their life on the land, who make hunting possible; the winter visitor, however much money he spends, does but little; the Hunt Secretary welcomes the latter's cheque, but the farmer prefers to see the former riding over his land.

The class of comment alluded to above should not emanate from the soldier, who is a bird of passage, and certainly not from Hoggenheimer, who would probably be better placed hunting jackals round Jerusalem on a jackass. (I hope however that my old friend A. J. Mc. N., who now hunts the last mentioned country is not plagued by the Hoggenheimer class, I doubt it.)

Those whose best riding days are over are inclined to crab the lads for breaking fences, and when hounds are not running, this is inexcusable and means much work for the "summer hunter" soothing some crusty owner or occupier. At the same time the vials of their wrath are also poured on the gallant fellow, who with hounds running hard, punches the top rail out of the big place in an impossible fence, although they are only too glad to avail themselves of the hole he has made. It is the case again of old Watchorn and George Cheek, when the latter carried away a rood of park palings.

On the other hand the young must not have it all their own way; we know that in the past some lads got into trouble with two she-bears because they mocked an old man, in spite of this warning the mocking still goes on.

Youth says (no doubt we have all said it ourselves) "why does old Evergreen come out hunting, never goes a yard, such good horses, too, all thrown away on him." The speaker may not know that old Evergreen was in his younger days a far better horseman and man to hounds than his critic can ever hope to be.

This reminds me of a dear old man whom we loved to draw, as his reputation with the long bow was second to none, though he never exercised his power of embroidery at the expense of anyone else.

One day we were moving off to draw close to a small river, more than a brook, quite unjumpable anywhere, Mr. Jorrocks would have described it as a navigable arm of the sea. A cheerful soul said "what will you bet I get old Longbow to say he jumped the river here?" Our spokesman approached his victim and said "now Capt. Longbow, was it in this field or the next that you jumped the river on that big chestnut in the good hunt we had from Babcary years ago?" He sat up at once and replied "ah, my dear boy, fancy your remembering that, let me see, it was close here, by that big willow, that was the spot."

This good sportsman was dining with my father and told a good old chestnut of his, how he lost a watch out hunting, and some days later in the same part of the country his horse went lame, and on examining the foot found his watch. My eldest brother, who will I feel sure be remembered by many in the Regiment as the "Herring," had come in to dessert as the custom was for small boys in those days, and prompted by his neighbour, a small voice was heard saying "And was it going, Capt. Longbow?"

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When I had the honour to know Capt. Longbow he rode some 16 stone, but had been one of the best G.R's of his time, amongst many other events winning the Grand Sefton.

It must be remembered that those who know much about hunting miss very little that goes on and soon differentiate between "Flash Alf" and the true sportsman. They notice the man who is quick off his horse to undo a gate and quick *on* again, who is ready to hold a horse or lend a helping hand, when required, who gives way to the "Fathers of the hunt" in a gateway, and who knocks the small boy on the rough pony down. The man who in his haste lets stock slip through a gate, especially on to a road, who drifts on, instead of standing still and holding his tongue, when hounds have their heads up, may think his crimes are not noticed but bad marks are chalked up in the memories of the men who matter.

I shall never forget my introduction to hunting in Ireland in 1898. The day after arriving in Clonmel, I was told hounds were at Balingarry Bridge next day, and an early train would take me to Laffans Bridge. I expected to find accommodation at the station as we had two hours to kill and only six miles to go. Finding a bare platform I pushed on in a snowstorm, turned in at the first te I came to and drew luck. My host met me at the door in his pyjamas and gave the stranger the warmest of welcomes. During a second breakfast he seized a gun which was already loaded in a corner of the room and shot a cat out of the window. No one could have been kinder, and when I say it was the owner of that well-known dun cob the White Ass, he will be recognised by all who hunted in Tipperary about this time.

One M.F.H. I knew in Ireland was a great character, an impatient man but the owner of a good poker face. One bad scenting day he was kept hanging about with a sticky fox in a thick gorse, he soon tired of it, and putting the horn in its case he cried with a loud voice "To —— with the —— hounds" galloped home, leaving the whips to collect hounds as best they might.

On another occasion, a hot day at the end of the season, he pulled off his coat, cast it to a lady as he passed through a haggard and continued hunting hounds in his shirt sleeves.

This gentleman was very fond of a deal in horseflesh and envied much a clean bred stallion, an exceptionally good hunter, owned by a member of his hunt, and though he tried often could not get the owner to put a price on him. Second horses were the exception in that hunt, but one day he saw the horse going home with a lad; he was drawing a cover at the time and out of sight of his field.

This was his chance; jumping out the cover, he told the lad Mr. M. had given him leave to try the horse. He had a jolly over some fences whilst hounds looked after themselves. That evening the lad reported what had happened, and his master was in the devil of a rage. Being an astute man he decided that he must either have the most awful row or lie low and get level; he chose the latter course.

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"Continued hunting hounds in his shirt sleeves."

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"The Doge of Venice."

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Shortly after, the Master gave M. a mount, and as there were all sorts in that stable, M. said that if it was a good one he would give thanks, if not he would pave it home on the road and give it laminitis. It was a bad mount, so M. galloped home and told the stud groom that he had leave to try all the horses left in. He did so, got a good idea of their form, and bought one that night, the Master knowing nothing about the trials until next day; of course he swore he had been done. I had a mount later on M's purchase and he did know his job.

We sometimes meet, and more often hear of the jealous man to hounds; those who override hounds from this cause we see daily, and if only they could appreciate how it shows up their ignorance of hunting they might mend their ways; the class however to which I refer, a small one I am glad to say, would see their rivals jump into a coal mine rather than give the friendly call, so much appreciated by most of us. They agree with my Lord Scamperdale "duck under Jack, you will have it full presently."

I would however sound a warning note in this respect; should the obstacle you consider impossible be of the nature of the Manchester Ship Canal, shall we say, and you know a handy crossing, you will receive thanks from those who profit by your local knowledge, but if it is merely a big fence you do not care about yourself, leave the warning out and go your way in peace. About 1898 a most determined Horse Artillery subaltern when out with the Kildares was hailed by a well known resident, who though a good man in his day, had turned aside from a forbidding place, shouting "you cannot get over there." The Gunner rammed on his hat replying "stuff and nonsense" and got over with a scramble. I am told he was never forgiven.

On the other hand I saw a man nearly drowned once, owing to a hasty reply, as to the practicability of a ford, the stream being in flood. Hounds crossed the stream and we skirted down towards a bridge; passing a ford a young "mud student," a capital lad on a horse, asked if it was practicable. A man who knew every yard of the country said "Oh, I have been over it hundreds of times," forgetting to add that when he did so the river was at least ten feet lower. We had some trouble salving man and horse, and no one did more to help than he who had caused the disaster, a real good man to hounds himself and one who would never let anyone else down if he could help it.

Whilst on the subject of rivers I feel sure a late Gunner, now a M.F.H., will remember how scurvily he treated a guest of his at a ford. The ford was very deep, bottom bad, and horses were plunging about in all directions; his guest, an Italian gentleman, was just in front of him, both horses started plunging, the guest's went down by the bows and the host's completed the disaster by climbing on top. The Doge of Venice, as he was at once nicknamed, got clear and swam to safety. Hounds had their heads up a field beyond the river, so all flasks were at the disposal of the visitor. In spite of his ducking and

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his host's protests he refused to go home and enjoyed his day immensely; he somewhat puzzled the Master by asking for a signed certificate of the hunt. He also had to sample a vast variety of liquor.

We read of brave men swimming rivers to keep with hounds, but though I have often seen it tried, it never came off; I refer to the deliberate swim, not the attempted leap. When horse and rider did both reach the far bank, the horse was always so beat when he got out, owing to bad landing, that he could take no further part in the contest. This may be due however to the nature of the countries I know best, the banks of most of the streams being very soft, it may be more practicable elsewhere.

I saw an attempt made this season, out with the Pytchley, to cross the Avon in flood near Catthorp. The attempt failed; riding with the man who tried it later in the day and discussing the subject of swimming horses, I made some fatuous remark on the above lines; it was good to be told that "he supposed some of us would go on trying until it came off," a very proper spirit.

I have never measured any big obstacle I have seen taken on out hunting, and particularly regret not having measured a place jumped by the late Capt. Boyd Cuninghame. It was a rail on top of a bank out of deep going, and hounds had been running hard for some time. I luckily found an easy place close by, and saw Boyd clear the whole thing, only to fall in a drain running at right angles to the fence; the worst of luck. My impression turning aside from the horrible place was that it was as high as my hat and I was not riding a pony.

Boyd, I regret he was not a Gunner, was the finest man to hounds I have seen in any country, nothing came amiss to him. He used to tell a story against himself which always appealed to me, as it is not often that the Field Master has the words put into his mouth and is taught by the Priest, as the Marriage Service lays down.

After a false start he did not rejoin the crowd as he should, but placed himself where he could do no harm (as he said). It happened in Ayrshire, and a well known supporter of the late Lord Eglinton's hunt went up to the acting Field Master and said "Wullie, do you see yon Boyd. Cry on him, Wullie, cry on him, and say 'come back Boyd, come back, —— your eyes, come back.' "

To enjoy one's hunting and feel that whatever may come it will be your fault if you are not there or thereabouts, a fit horse is the first essential. In pre-war days, when everyone could afford to keep twice as many horses as he can now, nothing was so pleasant as to have one or two young ones coming on, the feel of a bold fresh horse would make any man brave.

But now if you are the "big burly youth, who curses his cumbrous bulk and envies now the small pigmean race he whilom kenned with proud insulting leer" you must choose between the pleasure of making a young horse, and seeing the end of a big hunt, unless you are lucky enough to have a big stud. That the light weight horse matures

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quicker than his larger brother, we all know, so the light weight man may be tempted to chance his luck and combine hunting and training.

We must remember that the light weights do not have a monopoly of the sport out hunting, and if you look round at catching time, you will find a much larger proportion of the welter division, than might be expected, considering the weight they have to give away.

I have noticed this in all kinds of countries, and have thought it was probably due to the fact that the heavy man is seldom tempted to ride anything which is not fit, and if he cannot afford the fresh six or seven year old horse, gets them at their second sale, when the dealers have done with them, namely nine or ten. The light man on the other hand is often tempted by a weed or thinks a young one will carry his weight through a hunt. Many horses can do twenty minutes, few forty at best pace and very few, without blood, bone and *age*, can do more. And after all it is the real big hunt we must not miss.

The man who thinks he is going to make money out of his hunting may or may not be successful, he will usually have to sacrifice his sport; the coper shines in the short dart but usually has some excuse to pull up before the end of a fine hunt, he goes out to ride and sell, not to see hounds hunt and kill their fox.

I have never seen a finer fox hunt or a longer point than that which we enjoyed with the Pytchley on the 28th December last; a twelve and a half mile point only touched one cover and killed him. I was convoying my small boy of twelve, at first hounds ran fast and then kept driving on. Naturally we could not be with hounds all the time but were never out of touch and had to gallop much faster and farther than those who were able to go the shortest way. Most, if not all of the young horses had to pull up, and many others stopped just before we killed. I do not know who was most excited when we were about to get hold of him, my boy or Frank Freeman. My horse and the boy's pony were fit to go on for miles, they were ten and seven year old respectively, and I venture to say that nothing much younger had a wag left in him.

I do not mean to infer that all the horses that saw the end were stone cold, but considering the conditions under which I took part in that hunt I could not have seen the end without the aid of blood, bone and *age*, the latter of course includes condition.

So far I have said nothing about hounds, but no one who has not hunted hounds himself, or has been Master for many years is really qualified to do so. Every day the members of the field have the opportunity of learning something, but it is to be regretted that the number who take an intelligent interest in hounds or hunting is very limited.

You hear people bucking about the fences they have jumped, the excellence of their horses, or the latest scandal, while hounds and huntsman are trying to unravel the line over which they have ridden. To cite one common instance; reams of paper have been covered with ink on the iniquity of going into a road, to say nothing of crossing it, until hounds have definitely carried the line beyond; the number of

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foxes which owe their lives to the almost universal neglect of this rule must be legion; but it is very hard on hounds.

In 1922 I was given a copy of "Foxhounds and their handling in the field," a letter written by Lord Henry Bentinck to Lord Chaplin about 1865, and I commend it to any who have not seen it; I had not come across it before.

It is an education to see Frank Freeman *fetch* his hounds, under almost any conditions, as laid down in this letter written over 50 years ago, once seen it will not be forgotten. It makes one sad to think of the way we have seen hounds *driven* after the huntsman by the whips, and this no doubt is one reason why some men can never get their hounds' heads down.

Lastly, to invert the order of things, comes the fox. Our sympathy must always go out to the good fox who has given us the best of hunts, but like Mr. Jorrocks, "it is not that we do not love the fox, but we love the hound more." We must also remember that every fox killed by hounds helps the preservation of foxes. When hounds do not kill foxes other people do.

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R.A. Woolwich Coach, 1923.

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COACHING NOTES: WITH SOME MEMORIES OF OLD DAYS ON THE WOOLWICH COACH.

By MAJOR-GENERAL G. H. A. WHITE, C.B., C.M.G., D.S.O.

Note.—This article first appeared in the Badminton Magazine, July and August, 1921, under the title "Some Coaching Recollections." It included reminiscences of stage-coaching which have had to be omitted here for reasons of space. The remainder of the article is reprinted with a few alterations and additions.

THAT four-in-hand driving should enjoy the same popularity to-day as it did in the days of the great coaching revival and for years afterwards is the wish of many an old devotee of the sport, and it is one which will be echoed by a large section of the community to whom the picturesque in life appeals, whether they be coaching men or not; but the competition between horse and motor is an unequal one, and it is to be feared that we must look for the glories of the road rather in the past than in the future.

It seems but yesterday, though it must be at least a quarter of a century ago, that one bright spring morning a muster of some 25 stage-coaches on the Horse Guards Parade provided a spectacle to gladden the heart of the horse-lover, and the crowd of spectators which assembled on that occasion was sufficient evidence of the sympathy felt by the "man in the street" for the "man on the road." Coaching perhaps more than any other sport has behind it the backing of tradition and romance, and the fact that in spite of the many obstacles that post-war conditions have placed in the way of the modern coachman there were on the road last season at least four well-appointed stage-coaches,[1] tends to show that enthusiasm for the noble art is not yet dead.

It cannot be said that the prospects of a second revival on a large scale are hopeful. The almost prohibitive price of forage, together with labour troubles, high wages, and the cost of living generally,[2] are factors which must tend to place this recreation beyond the reach of the man of moderate means, while to these drawbacks must be added the increasing motor traffic, with its inevitable accompaniment of roads rendered dangerous to horses by their hard and slippery surface. Yet there are no more popular events at Olympia than the Coaching Competitions, and as long as the equine species survives, I hope and think that Englishmen, and especially English officers, will take delight in putting four horses together.

[1] In 1923 the number was reduced to two.

[2] Written at a time when the price of commodities was even higher than to-day.

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My first experience of four-in-hand driving dates from 1891, when as a young officer quartered at Woolwich I was initiated into the mysteries of the science by Captain Morley Knight, R.A., now Lieutenant-Colonel C. Morley Knight, D.S.O., O.B.E. "Morley was one of the best amateur coachmen of his day, and his book "Hints on Driving" is in professional opinion the most instructive work in print on the subject. Colonel Knight has been obliged to give up driving owing to a broken wrist, but is still occasionally to be seen on a coach, and his former pupil can never be sufficiently grateful to him for his early instruction in the art. Other fine Regimental coachmen were Lieut. Birch, R.H.A. (now Lieut.-Genl. Sir Noel Birch), and the late J. C. Kirk (then a subaltern in the Riding Troop), from both of whom I learned a great deal.

The old Woolwich Coach has survived numerous adventures and hairbreadth escapes. It served as a nursery for many budding coachmen, some of whom rose to great proficiency, though it is to be feared that a large number never got beyond the nursery stage. Many of my contemporaries in the Regiment will remember Evans, the coach groom whose sphinx-like countenance remained so imperturbable through most disasters. He bred bull-dogs, and perhaps absorbed from them some of the courage associated with the breed, but there were a few charioteers with more valour than skill who managed to shake even his iron nerve. One of these he summed up in a sentence which became historic. Commenting on this officer's uncertain efforts to steer the coach safely home through the arch into the East Square, and alluding to the adjacent sanctuary of the R.A. Institution, Evans thus announced his policy of "safety first": "When Mr. —— is driving I get off at the Institoot."

Another gallant officer was known to be most impartial in his favours with the whip, and great was the reluctance of passengers to occupy the back seat of the coach when it was rumoured that Major —— was to drive. The swish of his thong was the signal for these heroes to turn up their coat collars, for it was a certainty that they would receive about their ears the punishment intended for a sluggish leader.

On one occasion the pedestrians of a crowded suburb were scattered in all directions and a newly decorated pillar-box nearly removed. Whether its fresh coat of vermilion paint exerted some compelling power over the coachman, as the eyes of a python are said to do over a rabbit will never be known, but the fact remains that from the middle of a road as wide as Regent Street he concentrated on that pillar-box, and drove his leaders on to the pavement on either side of it, with the result that the horses when extricated were found to have carried away most of the wet paint on their flanks.

Breaking a pole is never a pleasant experience, especially when descending a hill. I have seen this happen more than once on the Woolwich coach, and on a certain memorable occasion, finding ourselves at Croydon in this predicament, and a four-in-hand pole proving unobtainable, it was far into the night before we were able to start

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for home, having borrowed a landau pole on to which an extemporised pole-hook had been rivetted.

The above mishap was caused by a leader called "Johnnie," whom Sir Noel Birch at least will well remember. This horse was a big blood hunter, bright chestnut in colour and very good-looking, but when upset he could pull like a train. We had invited down to Woolwich a professional coachman of our acquaintance, for the double purpose of offering him a drive and of receiving a lesson ourselves, and after a generous luncheon in the Mess, the party set out, with the Greyhound Hotel, Croydon, as the objective. It was soon evident that Johnnie was on the war path, and that our mentor was far from happy, but he hung on gallantly until the awkward turn into the Greyhound yard had to be negotiated. Johnnie, with his blood up, scorned the first application of the "aid," but whipped round so sharply in response to a second loop in the lead rein, that the pole snapped in the socket like matchwood. We all regretted that this contretemps should have occurred to our guest on his first and only visit, but he could perhaps hardly be blamed for the accident, as this horse, on days when he meant business, was a tough customer for even the strongest of coachmen to tackle. The effect of the above episode was to render him almost unmanageable, and the two of us whose job it was to drive home were glad enough when the lights of Woolwich appeared, which was not till past midnight.

On the whole however the Woolwich coach seemed specially favoured by Providence, and I only remember its meeting with one serious accident. This was caused by the coachman being too tired to hold or steer his team. In trying to turn into the centre arch of the R.A. Barracks at about 10 miles an hour, the front wheel hit a post and brought the coach up short. The leaders got away, and one dashed his brains out, the other being permanently injured, and the coach considerably damaged.

Some amusing episodes are connected with the coach at this period. One young officer, the stability of whose banking account varied inversely as his popularity, high spirits, and gambling propensities, had got into such hot water with the Ring that he dared not be seen on a racecourse. Being determined to attend the Epsom Summer Meeting and to bet on every race as his custom was, he hit on the expedient of taking cover inside the coach, a seclusion from which he never emerged during all four days of the meeting, a friend being sent into the ring before each race to do his commissions.

On another occasion, just before Ascot, I was approached by a brother-officer whose hobby it was to be constantly inviting German officers to the Mess, a taste which seemed perverted even in days before the Hun had made himself so obnoxious. It appeared that the one ambition of Ober-Lieutenant the Baron von ——— was to go to Ascot, and I was requested to find room for him on the coach. After much clicking of heels the matter was arranged, and on the Tuesday morning our guest accompanied us by train to Windsor, where we were to meet the coach. Though a hot day he wore an overcoat, and did not remove

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it till the course was reached. He then proceeded to strip for the fray, and our astonishment may be imagined when we discovered that beneath his elegant dust-coat he was still more magnificently arrayed in full evening clothes—swallow-tailed coat, white tie, "boiled" shirt, and all complete! This was rather a staggerer, but worse was to come, for the Baron proceeded to punish the champagne in a manner that showed him to be no novice. He pledged all and sundry, until his shirt-front became more and more crumpled and his tie worked round under his ear. This exponent of "Kultur" never left the luncheon tent all day, and finally became so much the worse for wear that he had to be bundled inside the coach and in this manner driven back to Windsor. It was a very "tired" looking baron whom we half lifted into a hansom at Paddington, and I never quite forgave my friend, but the episode had the salutary effect of keeping Germans out of the Mess from that time forth.

Many enjoyable drives we had on the old Woolwich "bus," and they were very popular with the ladies of the garrison. Sometimes we would send out overnight as many as five change teams to various pubs in the neighbouring Kentish villages, and starting off at 9 a.m. with a full coach would return to barracks in time for a late dinner. On these occasions the inside of the coach was crammed with spare harness, intricate brain-work being also required to ensure the teams arriving at and returning from their respective destinations, and time being properly kept at the various changes; in fact the working out of the arrangements was no mean training for future staff officers in the art of writing orders.

In 1894 I was at Aldershot, and did a lot of driving with Kirk, whom I have mentioned above, and who was a great enthusiast and a very fine coachman. We had the coach out four days a week throughout most of the year, and were seldom deterred by weather, unless by a frost so severe as to make the roads impossible. In addition we seized every opportunity of a day on one or other of the numerous stage-coaches then running out of London.

I am convinced that it is only by such continuous practice that a man may hope to drive well. Four-in-hand driving is not a thing one can successfully take up in fits and starts. Until the muscle of the arm gets hard, it is out of the question to drive even a light-going team with confidence and efficiency, and the quickest hand is apt through disuse to get slow in manipulating and adjusting the reins. It is a study in optimism to note the cheery confidence with which an inexperienced coachman, and one who has perhaps not driven for months or years, will undertake to conduct a party say to the Derby, though this is an enterprise requiring all the skill of a driver who is not only thoroughly competent, but whose muscles are fit from recent practice. On at least one such occasion I remember the Woolwich coach ignominiously returning from Epsom with a "pick-axe" team, the missing leader having so exhausted the coachman that it had to be taken off and left at a wayside inn.

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On the other hand when the driver is in practice and his muscles are hard, there is no more pleasurable feeling than that of having full command of the situation whatever Bolshevik tendencies the team may exhibit. Under these conditions the reins are less likely to slip, and as a result all four horses will trot away crisply together, instead of drifting along independently in a dull and aimless fashion like a ship without a helmsman. Anyone who has seen a fine coachman take over a team that has been allowed to go in this manner through incapable handling, will have noted the almost electric thrill that at once seems to be imparted to them. The effect of the change is magical, though the driver appears to do nothing, and it all looks so easy; but the explanation is that in driving "ars est celare artem," nor can any man be called a fine coachman who is not also a *quiet* one.

It has been said that no secret is so close as that between a horse and his rider, but a team and their driver should be included in this dictum. How seldom does the heedless "fairy" on the box-seat realise, while babbling of trifles to her neighbour, that the latter may be having all he can do to keep control of his horses, and is not pining for conversation. Many a coachman gets a reputation for absent-mindedness, or perhaps for being endowed with one of those "strong silent natures," when at that moment the former quality is the last he would lay claim to, and if he is guilty of being silent, this is due to the stern necessity for concentration on the work in hand. I wish not to seem churlish, but I would protest against an undue exercise of the power of speech on the part of the box-seat passenger. If horses are pulling or going raggedly they will demand all the attention of their coachman, while if the contrary is the case and they are going like four angels, the driver will grudge any distraction from the full enjoyment of such pleasant conditions. Beware also of the garrulous coachman; it is long odds against his ability to conduct a conversation and a coach simultaneously and efficiently.

I may here remark that it is often easy to spot whether a man is a workman or otherwise merely by watching his whip from behind. If it is held steadily at an angle of about 45 degrees, with the thong in its place just below the quill, this is strong evidence that all is well. If on the other hand the point of the whip shivers and quivers like a fishing rod, and the thong gets tied up in knots or works down to the handle, depend on it the coachman is "busy driving" and has a lot to learn.

There are happily still officers in the Regiment who are keen on four-in-hand driving. Both the Woolwich and Aldershot coaches have been revived since the war and—as recorded in the December number of the Regimental News—were going particularly strong last summer. Several prizes were won at the various Shows (for details see also the "News"), and the two coaches enjoyed a most successful season.

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The traditional colour of the Woolwich coach horses has for many years been chestnut, though there was a famous brown team some 35 years ago, with which many of our now senior officers had their first driving experience. The present team of chestnuts are hackneys—a good looking lot, all with smart action, the leaders being particularly well matched. It is to be regretted that the "hunter with action"—once easily obtainable—is now so scarce. There is no more desirable type of horse with which to do a journey, and it is astonishing what daily mileage can be covered with a team of this class provided they have quality and substance, and are driven with judgment. At the same time the hackney breed is often much maligned. It is the fashion to say that they are lacking in stamina, and the Show-Ring has doubtless encouraged a type in which extravagant action has been allowed to eclipse more stirling attributes, but the hackney of the right pattern with substance and medium action can well hold his own on the road with other breeds, and is by no means deficient in pace. Some of the fastest and best appointed stage-coaches before the war were horsed to a great extent by hackneys, and showed a satisfactorily clean casualty sheet at the end of each season.

It is to be hoped that both our representative coaches will receive continued support in the future. The obstacles to coaching at the present day, though by no means negligible, are often much exaggerated, and a great deal of fun may still be enjoyed, as I have endeavoured to show in an article entitled "Coaching in the Services" in the current (and first) number of the new Service Quarterly "The Fighting Forces." Coaching as a sport should appeal to hunting men, for the pleasure that every true horseman feels in getting on comfortable terms with a good horse is increased fourfold with a team, each member of which provides in itself a problem of surpassing interest—moreover the two sports work in with one another, as each may be enjoyed in its own season. For Artillery officers in particular four-in-hand driving should hold attractions, owing to the exceptional opportunities they have for indulging in it—opportunities which will cease to exist only on the day when battery stables are tenantless, forage-barns have become petrol stores, and the universal employment of mechanical traction marks a new era in the history of the Regiment. The coming of that day is inevitable, and must be accepted as another milestone in the march of Science, but the change must bring us sadness, for it will mean the passing of some of our most cherished traditions into the land of memories.

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INDIAN SPORT.

By MAJOR-GENERAL A. E. WARDROP, C.B., C.M.G.

IT is not easy, in the space of a few pages to render justice to the unlimited sport that can be obtained on the great Indian continent. All that can be hoped for is a brief account of what may be expected, rather than a series of word pictures urging brother officers to seek of India all that she offers with so lavish a hand.

The Royal Artillery in common with the rest of the army has been bitten with a mistrust of India to such an extent that in the past few years it has been difficult to maintain the full supply of officers.

This has been due partly to a fear of expense and partly to a liking of our youngsters for the amenities of modern civilized life.

Anxieties over expense have been considerably exaggerated. Major-General Sheppard, the well-known racquet player and athlete, has just been shooting in the Kashmir Himalayas and has published, for private circulation, a booklet dealing chiefly with the expenses and arrangements of a shoot in the hills. Although licenses and cooly hires in Kashmir have been increased in a regrettable degree, yet even so there is no doubt that a subaltern can shoot, and shoot successfully, for quite a small sum. The writer himself met one subaltern this year who had done a very good shoot on his pay.

As for the plains of India, the writer has proved from a fairly comprehensive experience of the last three years, that on an average expenditure of from 700 to 800 Rs. a month, it has been possible to shoot on a considerable scale elephant, buffalo, bison, tiger (chiefly) bear, panther and sambhur. This monthly sum has included rail fares all over India, and seems a considerable amount. But when the Secretary of the Institution and the writer were young subalterns at Secunderabad the average monthly expense for a three months' shoot was 400 Rs.; while their monthly pay was 220 Rs. Whereas now a subaltern's pay is 450 Rs. and the 700 Rs. mentioned could be largely reduced by the absence of long railway journeys, and shooting in company.

The second reason against India, the preference of many for motoring, dancing and entertaining to the pursuit of wild sports can only be overcome in the public schools, Woolwich, and a changed attitude in the outlook of modern youth. There is no doubt that one of the most serious considerations of a commander as regards his officers is how best to encourage and lead them in all manly sport. Certainly such encouragement, in India, is seldom lacking.

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Indian sport is, curiously enough, less known and appreciated than it was thirty years ago. This is chiefly due to the numerous books and big game films of Africa that have appeared. Until the production this year of the Fawnthorpe-Vernay film there has been no good film of Indian big game shooting. The money and enterprise have all gone to Africa. Moreover, the difficulties in India have been all against film work: the heat, the incomparably heavier nature of the jungles, the greater shyness of the animals, as evinced for instance by a tiger compared with a lion, have been deciding factors. Yet surely in these difficulties whether for film or rifle lies an additional charm.

It must never be forgotten, too, that for the man lucky enough to be quartered in India big game lies at his very door. A train journey may, at the worst, be necessary, but he will have no oceans to cross.

The fauna of India, themselves, may safely stand comparison with those of any part of the world. Few that have shot in India elephant, buffalo, bison, tiger, sambhur or the Himalayan goats would admit that in the excitement of the actual chase, in the size and beauty of the trophies and in the grandeur of the scenery and of the surroundings, the sport obtained could be surpassed by that of any other country.

In the Plains of India the actual head of game has certainly improved. Tiger are more numerous now than at any time during the last thirty years. During the war there was no shooting. Civilian officers of all services are now from political reasons too occupied to shoot to the extent they did before. Touring is frequently discouraged, and finances no longer permit the "tours" by District Officers that combined work with odd hours of sport and did so much towards the good government of the country. Army officers have recently shot much less than of old though this state of things is improving.

The chief probability of any decrease in big game in India lies in the indiscriminate issue of firearms to all and sundry.

In the hills sport has decreased: not improved. The lack of officers shooting during the war was counterbalanced by the greater poaching that then took place and which has not yet been satisfactorily suppressed. The Territorials while in India, from a lack of knowledge, paid far too much for everything and expanded permanently the already open mouth of the simple Kashmiri. The new allotment of certain nullahs, whether they hold game or not, and the apparently arbitrary tariffs that have recently been raised in Kashmir have not been helpful. However, all is still well in the great hills. The writer has lately had there excellent sport, and the even greater pleasure of seeing youngsters swinging proudly home with fine trophies of markhor, ibex and red bear following carefully packed and guarded in the transport in their rear.

To turn now to actual details of the animals themselves, pride of place must naturally be given to Pig—"The Boar, the Boar, the

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mighty Boar." This animal is to be found in rideable ground in nearly every part of India. The cream of the country, the Shires, lies in the United Provinces, but all over Bengal and the Central Provinces with the famous Nagpore Hunt as the hub, exceedingly good sport is to be obtained; and hunters there and in the Bombay Guzerat country would certainly admit no superiority of any Tent Club or Private Hunt even in the United Provinces. In the south of India pigsticking is to be obtained in patches which could be readily extended by expert reconnaissance. In the Punjab and the North of India pig undoubtedly exist and if unmolested would afford good sport. But excessive irrigation, unrestricted gun licenses, the fact that every villager is a potential if not an actual poacher, and the apparent impossibility of getting a reliable shikari, combine to render sport difficult. Yet these obstacles can be overcome, and thanks to Major Vigors of Hodson's Horse two good pig have been killed this year and another speared and lost within five miles of Lahore cantonments, the chief helper being a dear old Akali ruffian begirt with sword and black puggree, true emblems of his hostility to the British and their works.

An article of a couple of months ago has shown the possibilities of good hunting on the Indus; and a good many pig have recently been found and hunted at Nabha, where in common with most Indian States their preservation has been a special care of the Ruling Chief for the amusement of his guests and himself.

Enough has been written here to show that pigsticking can be obtained practically throughout India, and it is impossible to urge too strongly officers to go in for this great sport. There is no need to compare pigsticking with hunting. Comparisons are odious. Suffice it to say that in hog-hunting a man will find as good a school as he could wish for his horsemanship, horsemastership, eye for a country, quickness, nerve and many of the qualities that go to make a good soldier.

It must not be thought that pigsticking is preached rather than polo. Each man to his last. To one man a game may appeal, to another wild sport may make an irresistible call. But whatever be a man's choice he should practise and play polo sufficiently well to make up a station game when required and get his own amusement in any place where big game does not exist.

Some men say "This is the day of the motor, why should we ride?" Yet the day is still far distant when the Staff or Regimental officer may not be required to take a message or carry out a reconnaissance on horseback across country. In attending a recent promotion examination on successive days at different stations the writer on the first day saw two of the candidates bucked off their weary horses: on the second day he found two of the candidates driving because the quiet hacking of the first day had made them too sore to ride.

In pigsticking a man must mount himself according to his purse. With even one animal it is well worth having a hunt, but two make a better minimum. The Remount rules are generous and were framed

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to help sport. There is certainly little excuse for a mounted officer not following the example after pig and at polo set by the Commander-in-Chief and the Army Commanders.

In the question of expense, pigsticking, apart from the original outlay on horses may cost anything from 10 to 20 Rs. a day. This includes food, transport and all hunting expenses. If a man hunts alone it will cost him more. But these sums compare favourably with the cost of a hundred cartridges—15 Rs. = £1, or the money that would be expended in a day's motoring in England, with a suitable companion and lunch thrown in.

There is here, alas, no space in which to dilate on the actual hunting, the good fellowship, gallant horses and joyous hunts over the wide Ganges plains or the rocky hills and flying fences of Central India. There shall remain from such days a fragrant memory that shall never fade and friendships that shall last through life.

India has been called the land of separations. Well it may also be called the land of friendship. For in this land there are no trains to town, no week-end relatives to visit. Here men work and play and enjoy together in their hours of leisure the sport that these afford.

Turning now to big game, it will be convenient to consider this rather by artillery stations than by the various fauna.

A proportion of the artillery in India is concentrated in pack, field, heavy and horse batteries along a line from Karachi and Hyderabad, through Quetta and Waziristan to Peshawar, Nowshera and Abbottabad, as well as in the Punjab itself.

Karachi and Hyderabad have at hand the Scinde ibex and the Scinde desert with considerable facilities for sport to the man who is ready to rough it on a camel for several days and plunge into the interior. Some of the stations such as Abbottabad have good shooting grounds near. But generally along the line indicated above big game shooting is confined to that obtainable in other parts of India or such ibex and local goats as current conditions and the surounding tribes will admit of.

These conditions apply also to stations in the Punjab where owing to the large extent of irrigation, the absence of forests and the unlimited issue of gun licenses big game has practically ceased to exist.

Below the Punjab come the United Provinces with artillery at most of its stations, Dehra Dun, Roorkee, Meerut (with independent Delhi near at hand), Jhansi, Agra, Lucknow, Bareilly and Fyzabad among them. All of these are really good sporting stations with excellent pigsticking, and good buckshooting, and in some cases such as Jhansi with fine tiger and sambhur jungles within reach. To all the United Provinces the great jungles of Nepaul, the Terai and the Doon are in regard to distance readily accessible. Much influence is required to obtain leave to shoot in Nepaul but in the Doon and Terai a shooting block my readily be obtained; although the conditions of the permit are somewhat cramping to the poor man who would fain "sit

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up" and has no line of elephants at his command. However, even the man without elephants has every right to hope, with luck, to include in his bag from these jungles tiger, sambhur, chital and swamp deer in certain localities.

Throughout this article no specific mention is made of bear or panther: these are to be found wherever the other carnivora exist and panther especially should afford the young sportsman a valuable initiation in the pursuit of dangerous game.

Shooting blocks throughout the Government forests of India are obtained on application to the local Imperial forest authorities. Their "permit" is generally for a month for each block: their tenant is bound to observe various game rules and may be sure of the cordial help and good will of the various forest officials.

South and east of the United Provinces lie the Central Provinces, Bengal and Assam. The former with their glorious hills and boundless forests are the real home of the tiger. No better book has been published on this country than the old Classic Forsyth's "Highlands of Central India": and this and the Hon. J. Best's recently published "Shikar Notes" are recommended to anyone who contemplates shooting there.

Included in the Central Province shooting may be considered the Deccan and the Nizam's dominions where first-class tiger shooting may still be obtained. Thirty years ago a party shot there 18 tiger on one trip and even better sport had been obtained a few years previous to that. The number of tiger that may be shot there by a single gun in a season is now limited but tiger are probably more plentiful than ever.

In the Central Provinces, in addition to tiger, sambhur of the finest type, bison, chital and gond can be obtained without much difficulty. Buffalo are strictly preserved and it is seldom that permission to shoot one can be obtained.

In Bengal and Assam generally are to be found all the animals already mentioned except bison. The heavier jungles of the latter Province hold buffalo, rhino and elephant: but the pursuit of these animals is expensive and requires the use of elephants.

In the extreme south of India are the grand hunting grounds of Canara, Coorg, Mysore and Travancore, at the door as it were of the batteries at Belgaum and Bangalore. Here are the lordly elephant, the bison at his best, the Nilgherri ibex, tiger (but hard to locate), moderate sambhur and chital, and poor buck. To shoot in these jungles the ever courteous permission of the rulers and their dewans must be sought.

The above somewhat tedious list gives a brief summary of the big game grounds of India proper.

Of the small game it need only be said that it is generally, throughout India, exceedingly good. But with cartridges at £1 a hundred, including customs duty, it is an expensive amusement. Indeed, even twenty-five years ago with cartridges at half the present

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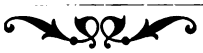
price the writer got more broke than he has ever been before or since during four years in which he tried, and signally failed, to shoot the record bag of snipe for India.

The writer is no fisherman and can give no notes on fishing. He only knows that trout can be got in Kashmir and the Nilgherries and Mahseer in most of the big rivers, the biggest, of very large size, coming from S. India.

Polo has been touched on. No occasion should be lost in taking advantage of the opportunities for learning and playing this game so universal throughout India.

No mention has been made of pigsticking competitions, of racing or of steeplechasing. The first is not sport: the last two are not indigenous to India.

In conclusion it may seem that this article is written in a strain too laudatory of India. This country needs no apologist. If the writer can only feel that he has persuaded some of his brother officers, who have not yet been to India, to enjoy her sport and the happy days that she offers, the object of this article will have been fulfilled.



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R.A. OFFICERS' THEATRICALS AT WOOLWICH, 1822—1900.

By COLONEL J. R. J. JOCELYN, C.B.

Note.—When an officer is first mentioned the rank he held at the time is given and if he became a General the same is notified; subsequently his surname only is employed.

1. Early Days.

THOUGH theatricals have always been popular in the Army, no station holds a record of regimental continuity comparable with that of Woolwich. An album preserved in the R.A. Institution contains the programmes of a large percentage of the entertainments given during the last sixty years, and from other sources glimpses can be obtained of even earlier times.

Lieut. B. E. Hill, who was in the regiment from 1809 to 1822, has left behind him some pleasant gossip concerning the Woolwich of the Waterloo era.[1] He was a great enthusiast where the stage was concerned, and he tells us how through the good offices of Colonel Quist, he and his friend 2nd Capt. E. Barlow, got permission to get up garrison theatricals in the town theatre. He describes several performances there in which they revelled in such substantial fare as the five-act comedies of the younger Colman, T. Morton and Centelivres, diluted by an occasional farce like "Waggeries at Windsor," or the famous "Bombastes Furioso."[2] Dr. T. Whitelaw, R.A., appears to have been the comic man of the company; of him Hill writes "Blessed

[1] Benson Earle Hill wrote three books; "Recollections of an Artillery Officer", "Playing About" and "Home Service". The last deals, *inter alia*, with life at Woolwich.

[2] Hill when in a preparatory school on Shooters Hill took part in the well-known tragedy of "Douglas", with another schoolboy, James Prescott. (Recollections of an Artillery Officer, i. 10). They were both stage-struck from that hour; they both went through the Academy into the Artillery and both eventually adopted the theatrical profession. Prescott who took the name of Warde had a very short career in the army, but made a name on the stage. (See Dict. Nat. Biog., lix., 349).

Barlow's father was the close friend of Mr. Thomas Harris, the lessee of Covent Garden Theatre and helped with dresses and properties. Hill was supplied with the actual wig in which Linton had played Fusbos in "Bombastes Furioso." Truefitt appears to have been maker up and perruquier. "Home Service," i, 237.

"The regimental Big Wigs" says Hill "regarded private theatricals with no friendly eye as interfering with the routine of drill and guard mounting," but Colonel Quist who evidently had great influence, " was a staunch supporter of amateur amusements." This remarkable man was a natural son of Gustavus of Sweden; he got a colonel's commission during the war with France and at this time (1821-2) was in charge of the Band and the Riding Establishment at Woolwich when he was close on 90 years old. After the theatricals he presented Hill with a gold snuff box. "Home Service," i, 171, 249, etc.

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with a phiz in which the eyes of Munden, the nose of Liston and the mouth of Grimaldi are blended in harmony, no wonder that he succeeded as a comedian. I have seldom seen a more perfect piece of acting than his "Old Rapid." [1] Other members of the acting set at this time were 2nd Captain W. Wylde (General) and Lieut. H. N. Daniel, an Irishman with a brogue that was not always under control. Professional aid was obtained from the well-known actresses Mrs. Orger, her sisters Mrs Lazenby and Mrs. Fawcett, and Mrs. Lamb.

Passing on to the fifties we find from "Jacksons Woolwich Journal" that the "King of Prussia" was given in the Theatre Royal, Beresford Street, with Capt. G. C. R. Levinge in the title rôle, Capt. J. J. Brandling and Lieut. F. H. B. Phillips being also in the cast.[2] "Done on Both Sides," "The Rose of Amiens" and "Box and Cox" were performed in 1858. The actors were Capts. W. H. Cox (Maj.-Genl.) and A. G. Paget, 2nd Capts. W. H. R. Simpson (Maj.-Genl) and R. P. C. Jones, Lieuts. T. H. Pitt, de Winton (Maj.-Genl. Sir F. W.), Teesdale (Maj.-Genl. Sir C. C.) and Alderson (Maj.-Genl. Sir H. J.). In 1860 there were two performances including "Prisons and Palaces" by Palgrave Simpson, the author himself taking part and also contributing a prologue which was spoken by 2nd Capt. R. Boyle. In 1862 an entertainment took place in the Riding School, R.A. Barracks, in aid of the distress in Lancashire caused by the Civil War in America. Among the pieces was an extravaganza, "Theseus and Ariadne," by J. R. Planché, who also provided a prologue spoken by Capt. A. W. Twiss (Maj.-Genl.), and "Retribution," where "the beautiful Miss Herbert," who took the town by storm as Diana in "Endymion" at the St. James', was ably supported by Dr. A. W. Clifton, R.A. A charming young actress Miss Nellie Moore, whose early death at twenty-three was universally deplored, was also in the cast, and the doyen of artillery actors, Lieut. O'Callaghan (Maj.-Genl. Sir D. D.), made his début.

The R.A. Theatre.

The first performance on the site occupied by the Recreation Rooms took place in November 1863, when a concert was given by the Choral Society in the "New Lecture Hall, R.A. Barracks." In the previous month St. George's Garrison Church had been consecrated, setting free the part of the barracks previously used for church services; Recreation Rooms were then opened and the Lecture Hall was, in fact, the old Chapel. The Hall soon became the Theatre, and the auditorium being altered and rebuilt in 1867, compared favourably in

[1] Old Rapid was a well-known stock part in "How to cure a Heartache." Whitelaw was cast for Gibby, the Highland servant, in "The Wonder or A Woman can keep a secret," when just before the performance he was ordered to the West Indies. Consternation reigned till through the influence of Barlow and Hill, the well-known actor James Emery, then at the zenith of his fame, with great good nature took on the part and as the performance was for a charity, declined any fee. "Home Service," ii, 65, etc.

[2] All three officers went out with the Expeditionary Force in 1854. Levinge died in Turkey and Brandling commanded C Troop, R.H.A., at the Alma and Balaclava.

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size and convenience with more than one London house. In 1903 this theatre was destroyed by fire, and rebuilt: in 1905 the present house was opened under the auspices of Lord Roberts, when a matinée performance was given.

The Amateur Dramatic Club.

In 1864 Lieut.-Col. Du Plat (Major-Genl. Sir C.) founded the R.A. Officers' Dramatic Club, which for a time was closely allied with the Windsor Strollers and Canterbury Old Stagers, amateur societies, with which Du Plat was connected. These societies occasionally gave their own entertainments in the R.A. Theatre under his management and from time to time certain of their members took part in the R.A. performances.[1]

The Club's opening night was February 22, 1864, when they gave "A Peculiar Position," "To Oblige Benson," and a Crimean version of "The Critic," in which Colonel de Bathe[2] was Puff, a part he had played before Sebastopol in 1856. Next night there was a fresh programme consisting of "Plot and Passion" and "The Mummy."

The Club was now fairly launched and went merrily on its way. Dramas, comedies, farces, burlesques and operettas succeeded each other in great profusion, all the well-known playwrights being put under contribution; nothing came amiss except tragedy and melodrama; on one occasion even grand opera was performed.

Du Plat remained at the head of affairs till 1875, but he never lost his interest in the R.A. Theatre, and was present when Zavertal's Operetta "Love's Magic" was given in 1891. His was a charming personality and the great success of the club he launched was in no small measure due to his genial influence and histrionic abilities.

The Sixties.

In the early sixties the acting group was represented by Twiss, 2nd Capt. E. Keate, Capt. G. Rotton (Major-Genl.), Boyle, 2nd Capt. W. R. Lluellyn, Lieut. R. Sandham (Major-Genl.), O'Callaghan and others. Twiss after playing Fouché in "Plot and Passion" left Woolwich; Keate, after playing several parts, including the title rôle in the burlesque of "Alladin" also moved on; Boyle, who played Champignon

[1] Apropos of the Club General O'Callaghan wrote in "R.A. Institution Leaflet," Oct., 1912, as follows:—"We had all ivory tickets inscribed with our names . . . . The Canterbury Old Stagers and Windsor Strollers were frequent performers and through the kindness of the Rt. Hon. Sir Spencer Ponsonby-Fane . . . . I have been able to insert the real names in some of the play bills. Sir Spencer himself, his brother Frederick Ponsonby (afterwards Lord Bessborough), Quentin Twiss, Brandram, Capt. Hartopp and his brother, Gen. de Bathe, Cavendish Bentinck, Harvey Fellowes, Augustus Spalding, Pemberton, Morse, Weguelin, Holmes and "Sam" Egerton . . . . are among the better known names of those who helped to fill the theatre in those days." Mrs. Brandram (Miss Murray) also acted at Woolwich. The last record of either of these Societies that can be found in the Album is that of Nov. 1879, when the Windsor Strollers played "A Lesson in Love", in which appeared those two notable actors Sir Charles Young, Bt., and Capt. Gooch.

[2] Afterwards Maj.-Genl. Sir. H. de Bathe, Bt.

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in "A Peculiar Position" and Desmarets in "Plot and Passion" assisted in the management and was in most of the programmes up to 1867 when he retired; Lluellyn played the King of Prussia in "The Sentinel" and several minor parts, and he wrote and delivered an excellent prologue for a charitable performance before leaving Woolwich in 1866. Rotton, who left about the same time, was best known by his assumption of Peter Probity in "The Chimney Corner," a part he played with credit elsewhere. Sandham preserved his relations with the theatre till his retirement in 1887, except for some intervals of foreign service. He was useful in small parts but was better known as a stage manager. He was responsible manager during two periods in the eighties. O'Callaghan after the early sixties was not seen at Woolwich for some time.

During this decade other officers made their début:—Capt. Rideout (Major-General A. K.) was a born actor and had excellent stage manners; for a time he played light comedy, stage lovers, such as de Brissac in "Our Wife" and the like, but later found his true métier in characters such as Colonel de Franc Epée in "The Lancers," Beau Farintosh in "School," and General von Hartmann in "Our Bitterest Foe." He closed his long and successful career in the R.A. Theatre in 1891.

Lieut. Seymour de Lacy Lacy has never been surpassed as an amateur low comedian. For nearly twenty years he was greeted with roars of laughter in the popular farces of his day, such as "The Area Belle," "Turn Him Out," and the like; he struck a higher note as Pomaret in "Our Wife," Acres in "The Rivals," Puff in "The Critic," etc., but his crowning achievement was Samson Burr in "The Porter's Knot," where he emulated, and not without success, that master of laughter and tears, Robson.

Lieut. F. C. Hughes-Hallett first made his mark as Solomon Probity in "The Chimney Corner"; a year or so after he took Charles Mathews' part, Sir Charles Coldstream in "Used Up," and also Lavater in "Not a Bad Judge," in both of which he displayed great ability. Up to the date of his retirement in 1872 he was constantly doing leading parts, including that of Jasper in "A Sheep in Wolf's Clothing" in 1868, when he had the honour of playing with Miss Ellen Terry who took Anne Carew, while her younger sister Florence was the child Sybil.

Dr. J. J. Pope, R.A., was for some years a breezy addition to the company. He excelled in such parts as Sir Regulus Rattan in "Ici on Parle Français"; he was also a success as Kester in "A Sheep in Wolf's Clothing"; he could sing a good song and his "Captain Jinks of the Horse Marines" is still remembered by the old Brigade.

Among those who were useful in minor parts were Lieut. A. F. Pickard, who played the Hon. Algernon Yawn in "Time Tries All," and 2nd Capt. G. W. C. Rothe who took Churchill in "A Sheep

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in Wolf's Clothing." For the ladies' parts professional aid was as a rule forthcoming.[1]

The Seventies.

It was now that du Plat excelled himself by his production of grand opera, when in December 1870, Lieut. H. B. R. Harvey appeared in the fourth act of "Il Trovatore" as Manrico with Madlle. Madigan of the Royal Opera, Covent Garden, as Leonora, the rest of the caste being gifted amateurs. Mr. J. Smythe conducted and the R.A. Band supplied full orchestra and chorus. It was a most successful and, for a regimental theatre, a wonderful achievement. Harvey was not the only vocalist of this period. 2nd Capt. O. H. Goodenough had a splendid voice. He was well known in musical society and organized several semi-professional concerts in the R.A. Theatre. He also took the musical Corporal in "The Sentinel," a part played twenty years later by Capt. Grierson (Lieut.-General Sir J. M.).

During the decade many fresh arrivals made their bow. In February, 1870, Captain M. C. Newall appeared as Mildmay in "Still Waters Run Deep," when his performance did not belie his reputation, for he was already well known. For years he was the star of the R.A. Theatre which he managed for a short time before his retirement in 1884. He then adopted the stage as a profession. In its issue of June 4, 1886, the "Sporting and Dramatic News" remarked "Colonel Newall has been many years before the public all over England, and has been a member at different times of nearly all our leading dramatic clubs. He has played something like a hundred and fifty different parts, his best known character in the south of England being Daniel White in "Milky White." The Sergeant in "Ours"; and Brown in "New Men and Old Acres," and Mr. Honeyton in "The Happy Pair," are also amongst his best assumptions. He appeared in all these rôles at Woolwich.

2nd Capt. E. T. Ouchterlony had a short but very successful career in the early seventies. He left a good record for his Colonel Brimstone in "A Nice Quiet Day," Lord Totterly in "An Unfinished Gentleman," and Honeybun in "The Contested Election."

Lieut. Slade (Maj.-Genl. J. R.) took some minor parts, such as Dunbilk in "Still Waters Run Deep," and the King of Prussia in "The Sentinel." He was a successful stage manager and was responsible for many excellent shows. He became responsible manager about 1875.

Capt. S. Parr Lynes was a reliable actor, and had considerable comic force; he did de Grignon in "The Ladies' Battle," Sir L. Paragon in "Perfection," and Maximilian Schloppsen in "The Sentinel," to mention a few of the parts he played and played well.

[1] A large number of well-known actresses have from time to time graced the artillery stage. In addition to those in the text the following ladies assisted:—Miss Ellen Turner, Miss Maud Haydon, Miss C. Leclercq, Miss Ada Dyas, Mrs. Stephens, Mrs. Leigh Murray, the two Misses Harris, the two Misses Addison, Miss Ada Cavendish, Misses A. & C. Wilton (Lady Bancroft's sisters), Miss Marie Illington, Miss Kate Rivers, Miss Caroline Hill and others.

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He became responsible manager of the theatre in 1884, a post he held with great success till 1888, when he handed it over to Colonel R. Corbett.

Lieut. G. H. O'Malley proved himself a distinguished light comedian in such plays as "A Husband in Clover," and was able to give the necessary force to parts like Baron Montrichard in "The Ladies' Battle. He was a useful member of the company for a few years.

Lieut. J. E. Josselyn had a first rate stage appearance, and played minor parts in a capable manner; after a long absence from the theatre he returned there in 1896 when he successfully took Sir L. Paragon in "The Parvenu."

Lieut. A. F. Liddell was but a short time at Woolwich, but in after years he became one of the best known actors in the Army. He had only a year's service when he played Leicester in "The Critic." He next made a decided hit as the French Usher, Turbillon, in "To Parents and Guardians," and finally in 1875 was promoted to Jasper in "A Sheep in Wolf's Clothing." He left Woolwich soon afterwards and his reputation was built up in India.

Lieut. H. C. C. D. Simpson played Churchill to Liddell's Jasper, his only appearance; but his treatment of this small but telling part did not escape the watchful eye of Du Plat, who congratulated the young officer and told him to persevere; Simpson did so, with marked success, as the chronicles of Simla in the eighties testify.

Capt. C. F. Glass was one of our big men; Samson Burr in "The Porter's Knot" was his masterpiece, but his Sir R. Broughton in "The Jacobite," his Lorenz Hartmann in "Helping Hands," his Max Harkaway in "London Assurance," to mention some of his successes, all displayed his wonderful versatility. He was also a clever scene painter and an excellent stage manager. His time at Woolwich was all too short. He did not act there after the seventies.

For some ten years Lieut. E. Bingham was the delight of the theatre; he was good all round and excelled in light and low comedy, in character parts and in burlesque. Thus he was capital as Captain Absolute in "The Rivals," as Moustache in "The Lancers," as Blasenbalg in "New Men and Old Acres," and Sergeant Bouncer in "Cox and Box."

Lieut. F. O. Barrington Foote had a family tradition behind him of which he was well worthy. From the time he left the Academy in 1870 up to his lamented death in 1912, when years had in no way affected his *joie de vivre*, he added to the gaiety of society. In character comedy, farce, burlesque and operetta he was as the saying is "undefeated." He was often in the bills up to 1890, some of his triumphs at Woolwich being Sir Anthony Absolute in "The Rivals," Sir Hartley Courtley in "London Assurance," Hugh de Brass in "A Regular Fix," and Cox in "Cox and Box." He could sing Dave Carson's "Bengali Babu" in a way few could emulate.

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Lieut. Flint (Brig.-Genl. E. M.) was an accomplished actor seen on the boards all too seldom. His most important part was Marmaduke Vavasour (Hare's part) in "New Men and Old Acres" which drew very flattering comments from professional critics.

Lieut. Slade (Lieut.-Genl. Sir F. G.) had a short but joyous association with the R.A. Theatre. His sense of humour, general comicality and power of facial expression won their way with everybody; he played amongst other parts Mr. Spanker in "London Assurance," William Rufus in "Helping Hands," and Blanquêt in "The Lancers."

Three other officers left short but very good records :—

Lieut. D. F. Downing made a decided hit in the leading part of John Carr in "Time Will Tell." He played some minor parts also.

Lieut. G. R. Spencer played usefully in several small parts, and distinguished himself in "New Men and Old Acres" in the character of Berty FitzUrse.

Capt. A. G. Yeatman (Maj.-Genl. A. G. Yeatman-Biggs) played the important part of Victor Du Bois in "The Lancers" and gained well merited praise from the critics.

As an exception to the professional actress, the Hon. Mrs. George Wrottesley made her début in 1865 when she appeared as Lydia Wyndham in "The Handsome Husband," and in "Betsy Baker," in the title rôle, but it was in the seventies that she began to act regularly in the R.A. Theatre where she had a niche peculiarly her own. Her Mrs. Malaprop in "The Rivals," her Madame d'Aplomb in "The Lancers," and her Mrs. Bunter in "New Men and Old Acres," to mention a few of her triumphs, were very remarkable assumptions; while for ten years or more she was the life of many smaller plays and farces, when she reigned *prima donna assoluta*. She was certainly one of the best amateur actresses that ever trod the stage and was remarkable not only for her ability, but also for her geniality and kindness of heart.[1]

The Hon. Lady Sebright and Mrs. Monckton, famous amateur actresses, well known in London, occasionally honoured the artillery stage with their presence, and when these two ladies and Mrs. Wrottesley appeared together in "New Men and Old Acres" in January '77, with Flint as Vavasour, Newall as Samuel Brown, Lacy as Bunter, and Bingham as Blasenbalg, a performance worthy of *any* stage was the happy result. Glass was the lucky stage manager.

Among other amateur actresses who appeared about this time were Mrs. Talbot, Mrs. Yeates, Mrs. Tyler, Mrs. Pope, and Mrs. Papillon. They all acted with great charm and were very much appreciated.

The Eighties and Nineties.

O'Callaghan, who had become a well-known actor returned to Woolwich in the early eighties and at once took a leading part in the

[1] See Leaflet quoted in Note 1 at bottom of p. 535.

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theatre. As Pierre in "The Rose of Auverne," as Box in "Cox and Box," not to mention many appearances on the concert stage, he displayed his musical powers, while his Prince Perovsky in "Ours," his Potter in "Still Waters Run Deep," his Lewis Hartmann in "Helping Hands," and his Beau Farintosh in "School," placed him in the front rank of amateurs. He was now in constant requisition, and he who had made his début in 1862 and had taken part in the earliest performances of the dramatic club, also sang in the opening matinée of 1905.

In the summer of '86 Lynes, the manager, had what must be described as a brain wave :—he would organise evening fêtes musical and theatrical in the R.M. Repository! These grounds were still unspoiled, there was green sward with trees, a lake, a bridge, an island, all of which would lend themselves to effective illumination. Then there would be Cavaliere Zavertal with his band on a lamp girt raft; there would be songs, lime light, tableaux, etc., Claude du Val dancing a measure on the grass, the Lily Maid of Astolat in her blazoned barge, Arthur and the three tall Queens in "flame colour, vert and azure," etc. These brilliant ideas came to full fruition, the weather was propitious, and two delightful evenings were passed.

About this time also Capt. A. W. Anstruther, who was in charge of the Gymnasium, organised two or three interesting Assaults of Arms in the Theatre.

There was plenty of new blood for the drama.

Capt. W. F. de H. Curtis played Baron Montrichard in "The Ladies' Battle," and was responsible manager for a short period.

Lieut.-Col. F. A. Anley was an actor of much experience. He played Baron Standbach in "The Secret Agent," the Duke of St. Lozels in "Time Will Tell;" and took Sir George Champneys in "Our Boys." The phenominal run of this play in London rendered the assumption a dangerous one for any amateur, but Anley acquitted himself excellently well; his subsequent retirement in 1886 was a great loss to our stage.

Capt. W. H. Davidson established a reputation in Bancroft parts; his Hugh Calcott in "Ours," and his Jack Poyntz in "School" were very creditable performances.

Capt. A. S. Griffiths only appeared in small parts, but he sang "Sgt. Bouncer" with great éclat in "Cox and Box."

Major E. T. Browell was greatly admired in general comedy. His Ledger in "The Parvenu," his Perkin Middlewick in "Our Boys," his Mr. Dobbymore in "Our Regiment" were specimens of good solid acting; his name was on the bills at intervals for some years.

Lieut. Mansell (Lieut.-Col. Sir J. H.) made his début as quite a young officer and quickly grew in fame and favour; he possessed true *vis comica* and had great power of facial expression. He played

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de Grignon in "The Ladies Battle," Sgt. Bouncer in "Cox and Box," Archie in "The Scrap of Paper," the Honble. Charles Tracey in "The Parvenu," and other parts with delightful *abandon* and ever increasing reputation, and finally took Frank in "A Case for Eviction" in the 1905 matinée.

Major Bunbury (Maj.-Genl. Sir H. N.) was a very clever actor. His Eccles in "Caste" and Hawkesley in "Still Waters Run Deep" were very good, while as Henri de la Fère in "Our Bitterest Foe" he touched the high water mark of amateur acting.

Major J. Younger was useful in light comedy; he played Duke Victor in "The Secret Agent," Lord Adolphus in "Time Will Tell," and other parts in a creditable manner; he had a good voice and took Sugden in the operetta "Retained on Both Sides" to the general satisfaction.

Capt. T. E. Carte excelled as a character actor: he played Isaac Woolf in "Helping Hands" and Lionell Leverett in "Old Soldiers"; his Krux in "School" was excellent.

Lieut. P. H. Flower and Lieut. C. B. Levita were reliable actors; the former amongst other parts took Sir Conyers Conyers in "Withered Leaves" and Dr. Sutcliffe in "School" very well; the latter was good as Sir John Ingram in "The Scrap of Paper."

The following officers in various ways gave useful service: Capt. R. P. Leach was as a rule cast for juvenile parts like Henri de Flavigneul in "The Ladies' Battle." Lieut.-Col. Richardson (Major-Genl. J. B.) was a fine vigorous actor as shown by his Scalade in "The Child of the Regiment." Capt. A. C. Hansard was a useful all-round actor, he played Baron Vonderbusch in "The Sentinel," Uncle John in "The Snowball," Barker in "The Phenomenon in a Smock Frock," etc. Major F. A. Yorke was a good low comedian and played Hodges in "An English Gentleman," and William Rufus in "Helping Hands." He was responsible manager during the early nineties, being succeeded by Major A. H. C. Phillpotts. Lieut. W. D. Burrard played juvenile lead as Lord Beaufoy in "School," Major J. R. J. Jocelyn played Dunbilk in "Still Waters." Dr. Penguin in "The Scrap of Paper," and other minor parts: a comedietta of his "Love at First Sight" was put on in 1888 by Corbett, who was then manager, and he supplied the libretto for Zavertal's operetta "Love's Magic"; he was responsible manager from the end of 1888 to the spring of 1901. Major F. W. Campbell and Capt. F. B. Toms were both very capable actors in comic parts, Lieuts. H. Rouse and S. Horton were very useful in the quieter rôles: the latter wrote libretti for the Christmas pantomimes. Capt. W. Carey Elwes and Lieut. G. W. H. Iago, both promising actors, only appeared once or twice, the former took the difficult part of Count Czernoski in "Time Will Tell," and the latter Talbot Champneys in "Our Boys" in a very creditable manner.

The Club owes a debt of gratitude to Major P. E. Pope, 4th D. Gds., to Major T. W. Barnes, A.P.D., and to Mr. Dawson Milward.

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Pope played de Ligny in "Our Wife," (a part set down for a tragedian), and de la Fère in "Our Bitterest Foe"; both strong parts. Barnes was usually *jeune premier* under Lynes' management. He played Sir Alfred Lindsay in "The Dowager," Charles Paragon in "Perfection" and many other parts with great distinction. Dawson Milward had not yet adopted the stage as a profession, but his friends who saw his Felix Featherstone in "The Snowball," his Mildmay in "Still Waters Run Deep" and his D'Alroy in "Caste" were in no way surprised at his attaining his present position in the theatrical world.

Many clever amateur actresses appeared during this period.

Mrs J. Younger made her mark as Gwendoline Petigrew in "The Parvenu" and other similar parts and distinguished herself as Araminta in the operetta "Retained on Both Sides." Mrs. R. Sadleir (not forgetting her pet pug dog) was a very good Violet Melrose in "Our Boys." Mrs. O'Dwyer gave a striking assumption of the title rôle in "The Dowager." Mrs. J. H. Thompson was a powerful Mrs. Sternhold in "Still Waters Run Deep." Mrs. J. J. Porteous and Mrs. J. B. Richardson were excellent in touch and go comedy, and Mrs. W. H. Suart showed real power as Blanche D'Evran in "Our Bitterest Foe." Mrs. C. P. Martel (Lady Martel) made a decided hit as Mrs. Major Moss in "Old Soldiers." Mrs. R. P. Leach was charming in youthful and sympathetic parts, and Miss R. Crofton and Miss A. Browne very useful in comic parts, but Mrs. Bainbridge and Miss Stuart were the bright particular stars.

Mrs. E. Bainbridge (Lady Bainbridge) was our best low comedy actress since Mrs. Wrottesley's time and most deservedly was very popular. As Miss Penguin in "A Scrap of Paper," Mrs. Booty in "Helping Hands," Majorie in "A Rough Diamond" and Belinda in "Our Boys," she was a queen of laughter.

Miss J. Stuart (Lady Mansell) from her first appearance showed herself a consummate actress in light comedy and emotional parts; she played Mrs. Mildmay in "Still Waters" and Margaret Hartmann in "Helping Hands" with great distinction. She was delightful as Josephine in "The Child of the Regiment" [1] and as Linda in "The Sentinel," etc., and crowned all with her Naomi Tighe in "School," where she had, in the character of Bella, the support of her clever sister Mrs. Synge, well known as Miss Granville in Sir George Alexander's company.

A notable matinée took place in March, '90, when after an excellent rendering by Miss J. Stuart and O'Callaghan of "A Husband

[1] The date of this production, May '88, is the only occasion the writer is aware of, when the Officers and N.C. Officers, who had their own club, joined forces. In "The Area Belle", which followed "The Child of the Regiment", appeared Sergt. H. Swinerd, for a long time the devoted and energetic General Manager of the R.A. Theatre, Gunner H. Lee, an excellent Clown in the Pantomimes and Mrs. J. G. Bilton, a very clever all round actress who for many years was well-known on the artillery boards, where her daughter Miss I. M. P. Bilton (Countess of Clancarty), also made her début when a child.

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in Clover," Cavaliere L. Zavertal's operetta of "Love's Magic" was performed by a professional caste before an audience in which the London press was fully represented. Mr. Ben Davies was engaged for the tenor part and the soprano was taken by Miss Clara Perry (Mrs. Ben Davies) who most kindly gave her services. The composer conducted and the piece was received with enthusiasm. The critics also were kind.

But as the nineties wore on officers' theatricals fell off for a time and the theatre was usually given over to travelling companies; then came the Boer War and finally the fire. With the opening of the New Theatre,[1] however, Woolwich theatricals got a new lease of life, but this is outside the scope of the present article.

[1] A very interesting event in connection with the opening matinée in 1905 was the appearance of Mrs. H. L. Tennant, who as Miss Maud Millet was so well-known in the theatrical world. She played with her husband Major H. L. Tennant, R.A. in "A Pair of Lunatics," and with Major and Mrs. J. H. Mansell in "A Case for Eviction."

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin belge des Sciences Militaires.—Mar., 1923.

Operations of the Belgian Army. (Contd.)

Notes on the use of Artillery in battle. Gen. Hellebaut.

The principle of fighting a battle (envelopment of the enemy—examples quoted: Cannae, Tannenberg, next the German plan of campaign, and the French plan are discussed, and finally the battle of the frontiers in 1914 with map). Major Jobe.

Light Tanks. (Contd.) Col Poulin.

France.

Revue d'Artillerie.—Feb., 1923.

Experimental artillery material in the U.S.A. Lt. Jean.

Defence of artillery against the enemy artillery intelligence service. Maj. Appfel.

On the various natures of fire. (Contd.) Col. Cambuzat.

The new German Artillery Training. Maj. Laurent.

Determination of maximum and minimum range. Lt. Remy.

Pack Artillery. The weapon of accompaniment (translation of Maj. T. C. Leah's article in R.A. Journal).

Infantry gun and howitzer in U.S.A.

Revue Militaire Générale.—Feb., 1923.

Lt.-Col. Cour. Sport as training for war.

Revue Militaire Francaise.—Mar., 1923.

Major Maurin. Rôle and employment of guns on railway mountings (I).

Maj. Laurent. The situation in Germany regarding raw materials.

Lt.-Col. M. Fournier. Russia in the early days of 1923.

Switzerland.

Revue Militaire Suisse.—Feb., 1923.

Col. Poudret concludes his review of Gabriel Hanotaux's new book *La bataille de la Marne.*

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Germany.

Militär Wochenblatt No. 26.

"French Policy in Rhineland down the Centuries" by Dr. A. Wiedersich. A survey of French activities in the Rhineland during the last 900 years. In his latest move, Poincaré has over-stretched the strength of France as did Louis XIV and Napoleon I.

"The best army in the World."

Lloyd George, in his recent series of Press articles, has alluded to the presence of a great German Army as one of the causes of the world war. The writer seeks to combat this and to attribute the war to the machinations of the three Entente states. The English fleet has been not, as Lloyd George alleges, merely a means of protection, but a continual instrument of aggressive expansion. The article concludes with the usual refrain, "in seeking to dispose of her German rival, England has given France the hegemony of Europe and the world."

Lucius Cincinnatus writes on the anxieties which impel the French in their occupation of the Ruhr and Baden, and points out that Germany cannot fight a war nor wage guerilla warfare; the latter has indeed never ended successfully against regular forces except in Spain 1809—1814.

Generalleutenant v. Altrock points out that the middle-classes (officers, officials, and small rentiers) suffer most from the fall in the mark. Both Government and private loans made in gold marks are repaid in paper marks and to-day 1 paper mark is worth about .000142 gold marks.

At the same time, an officer retired on a pension, who is entitled to a wound pension, receives, on this account, 720 marks, per year if above the rank of major and 1200 marks per year if of that or lower rank.

Heerestechnik. No. 1. Jan., 1923.

A monthly publication which has replaced "Technik und Wehrmacht."

"Theoretical considerations with regard to the 'life' of the bores of our guns, trench-mortars, rifles and pistols, and with regard to the relation thereof to the method of centring the projectile." The first instalment of an essay by Hauptmann Justrow of the Inspectorate of Arms and Equipment. It will appear in book form.

"The technique of permanent fortifications amongst Sand-dunes." Major Klingbeil.

The two above articles are described as 'official.'

"The Construction of Military Weapons, with special reference to small arms and machine-guns," by K. Bästlein. Some considerations affecting the manufacture of fire-arms. (First instalment).

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General Schwarte reviews the German attacks on the Camp des Romains Fort at St. Mihiel, in September, 1914.

The first instalment of a review of a year's (1920/21) work in the National Survey Office (Prussia and Saxony).

Heerestechnik No. 2.—Feb., 1923.

The above articles are all continued. The following are new contributions:—*Official Article*, "The employment of motor-cars and motor-lorries off metalled roads" by Hauptmann Fries, of the Inspectorate of Arms and Equipment. This article discusses briefly the constructional features and the possibilities of motor-vehicles for use on unmetalled roads and for cross-country work.

Unofficial Article. "The repair of big iron bridges in the field" by Lt. von Stammbach, 1st Pioneer Battalion.

Artilleristische Monatshefte. No. 193/194.—Jan./Feb., 1923.

"Ballistics at long ranges." The first instalment of an essay by von Eberhard on the influence of the lower temperature and atmospheric pressure in the higher strata.

"The development and the rôle of artillery in and since the World war." The first instalment of a very interesting essay. The writer discusses, inter alia, the best proportion of guns per thousand rifles, of heavy artillery to light, of howitzers to flat-trajectory guns, the calibre and range of field guns and the organisation of field artillery.

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PRINCIPAL ADDITIONS TO THE LIBRARY.

"Anon." The Pomp and Power. London (Hutchinson).

Grouard (Lt.-Col.) La Conduite de la Guerre jusqu'a la Bataille de la Marne. Paris (Chapelot) 1922.

The Regimental Roll of Honour and War Record of the Artists Rifles (1/28th., 2/28th., and 3/28th Battalions, The London Regiment, T.F.) London (Howlett & Son) 1922.
(Presented by Col. H. A. R. May, C.B., V.D.).

Bird (Major-Genl. W. D.) A Chapter of Misfortunes. The Battles of Ctesiphon and of the Dujailah in Mesopotamia. London (Forster Groom) 1922.

Theys (Commdt. Robert) Nieuport, 1914-1918. Les Inondations de l'Yser et la Compagnie des Sapeurs-Pontonniers du Genie Belge. Liege (Henri Desoer) 1922.

Mousley (Capt. E. O.) The Secrets of a Kuttite. London (Lane) 1921.

Montreux (Capt. A.) Considerations sur l'Artillerie de Montagne. Paris (Berger-Levrault) 1922.

Challeat (General) Le Regale muet ou "Calcule" de Tir de l'Artillerie. Paris (Berger-Levrault) 1922.

Leveque (Col.) Essai sur la Fortification Permanente Moderne. Paris (Berger-Levrault) 1923.

Boucher (General Arthur) Les Lois Eternelles de la Guerre. I. L'Art de la Guerre il y a vingt-trois Siecles. Paris (Berger-Levrault) 1922.

Fuller (Col. J. F. C.) The Reformation of War. London (Hutchinson) 1923.

"Anon." The Path to Peace. London (Hutchinson).

Hamley (Genl. Sir E. B.) The Operations of War. 7th Edition revised by Major-Genl. Sir G. Aston. Edinburgh (Blackwood) 1923.

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin belge des Sciences Militaires.—April, 1923.

Operations of the Belgian Army (Contd.).
Light Tanks. (Contd.) Col. Poulin.
Artillery liaison detachments in the approach march. Maj. Derousseaux.
Bilateral observation. Col. Grade.

France.

Revue d'Artillerie.—March, 1923.

Methods of fire against aircraft. Gén. Sainte-Claire Deville.
Divisional Artillery in attack. I. The 42nd Divn. on Aug. 21, 22, 1914. Col. Verguin.
Heavy Artillery methods of fire (1880-1918). Maj. Marescaux.
Ground fire as a special case of A.A. Fire. (Contd.) Lt.-Col. Pagezy.

Revue Militaire Générale.—March, 1923.

The advance guard on the Rhine.

Revue Militaire Française.—April, 1923.

A raid carried out by the 132nd Infantry Division, 14th July, 1918 (with map). Gén. Huguenot.
Employment of Artillery on railway mountings. Maj. Maurin.
Notes on the 1922 aeronautic exhibition. Lt.-Col. Pagezy.

Switzerland.

Revue Militaire Suisse. March, 1923.

Ludendorff's strategy. Col. Lecomte.
The alteration of the 75 m.m. gun (with 5 plates) Col. Buchi.

Germany.

Militär Wochenblatt. No. 27. March 1st, 1923.

" Sir Douglas Haig's Command " is reviewed.
" Poland and the Baltic States." A review of their armies and military politics from October to December, 1922.
" A Russian Cavalry Massed Attack against German Infantry," an account by Lt.-Col. von Clausius of an abortive attack by Trans-Amurian cavalry near Kowel on 2nd July, 1916.

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General v. Zwehl reviews the " Memoirs of General Field Marshal Alfred, Count v. Waldersee."

" War Games on the Map," a short review by General v. Altrock of a book on this subject by Hauptmann Haase, of the Munich Officers' School.

An order by the Army Council is published, which places the decision as to the wearing of mufti by officers and men in the hands of commanding officers.

No. 28. March 15th, 1923.

General von Zwehl comments on the criticisms which have appeared in " France Militaire," of Dewar and Boraston's book on Lord Haig. These criticisms are stated to have been directed towards preventing the abstraction of " a single twig from the laurel wreath " of Marshal Foch. General von Zwehl, on the other hand, suggests that this wreath was earned chiefly by copying General Ludendorff's methods with more ample resources.

" The Question of the Infantry Gun."

The various attributes which are necessary for an infantry gun and the types evolved in various countries are shortly discussed. The writer advocates a gun which will deal both with tanks and with infantry targets; a high charge, giving a muzzle-velocity of 400 m. per sec., being used for the former, and a lower charge, giving a M.V. of 250 m. per sec., for the second. Armour-piercing shell with delay-action fuzes would be used against tanks, time and percussion fuzes against infantry targets; a few grape-shot, but no shrapnel, would be provided. It is generally argued that the calibre should not be less than 6.5 c.m., the weight of the shell not less than 4.5 Kg. Such a gun will necessitate the retention of a L.T.M. as an auxiliary. The writer is against a pack equipment. Motor transport (caterpillar tractor) for infantry guns leads rapidly to the evolution of the tank as the suitable anti-tank weapon.

A survey of the state of the Russian Army is supplemented by an extract on the same subject from the *Army and Navy Journal.* The cavalry and infantry are good and also such air force as exists, but there is a great lack of artillery, tanks, and armament and technical equipment in general. The Russian army of to-day is better than that of 1920, and certainly equal to the Polish.

A survey of the military technical press of the world touches on many things, from field-glasses and photogrametry to motor sledges, gas-warfare and automatic rifles.

" Volckheim's book, " German Tanks in the World War," is reviewed by General von Altrock, who admits that the value of tanks was greatly under-estimated in the German Army.

There is the usual interesting brief survey of military events throughout the world, followed by a review of the foreign military press.

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin belge des Sciences Militaires.—May, 1923.

Operations of the Belgian Army. (Contd.)

Artillery support of infantry in an attack. Col. Nuyten.

Col. Nuyten's article deals with "the opportune and effective action of artillery to enable the infantry to reach the jumping-off place for the assault." He divides his article as follows :—

I. A mass of guns under centralized command cannot guarantee the support of infantry engaged in an offensive battle.
II. Artillery should be decentralised as far as is necessary at the right moment.
III. Infantry should possess as part of their own organization guns of accompaniment.
IV. Conclusions.

An interesting article with a good deal of information about French and German methods.

France.

Revue d'Artillerie. April, 1923.

Impressions of Germany. Thuringian history and legends. Major Graux.

Some methods of taking bearings by use of theodolite. 2nd Lieut. de Bois St. Lys.

Divisional Artillery in attack (continued). Col. Verguin.

Gas driven lorries. Capt. Maisons.

Helicopters.

Reveu Militaire Générale. April, 1923.

The break-through at Dobro-Polé. Lieut.-Col. Theodoroff.

Strategy and operations in the North (vi). Capt Kuntz.

Review Militaire Française. May, 1923.

Gen. Daniloff. The first Russian operations in 1914.

Lieut.-Col. Pagezy. Notes on the 1922 aeronautic exhibition (concluded).

Lieut.-Col. Tournes. Defence of a modern fort.

Germany.

Militär Wochenblatt, No. 29. April, 1st, 1923.

"The French in the Ruhr and Germany," by Lieut.-Gen. von Cramon. Germany in the war did not commit such atrocities in France and Belgium as the French are now inflicting on the West-

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phalians in peace (these alleged misdeeds are described in this writer's usual exaggerated style). Germany need not expect help from other countries, which are all self-centred. If France succeeds in forcing Germany to fight, even that country's disarmed state will not cause 60,000,000 Germans to go under.

"The French Railways at the beginning of the War," by Major Dr. Kretschmann, reviews the work done by the French railways in the first two or three months of the war, and praises their efficiency.

"The Infantry Gun Question." A reply to Hauptmann Pfeifer's article on the subject in the last number of this paper. His solution is suitable for dealing with M.G. and T.M. nests and with infantry guns, but anti-tank work necessitates the 3·7c/m gun or a heavier gun. The use of heavier calibres complicates ammunition supply. The writer suggests that the L.T.M. be dropped for the present and each battalion of three companies be allotted two 7·5c/m guns and six 3·7c/m guns (eight 3·7c/m guns to a four-company battalion). The writer insists on the great moral effect on the infantry of anti-tank weapons firing from the front line instead of from 2000 yards to the rear, especially in low visibility.

General von Altrock favourably reviews Major Hausser's book on the use of the heavy machine-gun.

No. 30. April 15th.

"The Military Political situation in South-East Europe," by General von Winterfeldt.

"The Second Artillery Deployment." The difficulty of deploying the artillery for the second phase of a 'break-through' attack. Advocates that the Higher Command should order so many tons of ammunition to be fired at each area and leave all further details of the artillery action to the subordinate artillery commanders.

General von Zwehl reviews Hermann Cron's book "The Organization of the German Army in the World War."

"New Forms of Drill." Preparation of troops for modern war.

Artilleristische Monatschefte, 195/196. March-April, 1923.

"Ballistics at long ranges" (continued).

"The development and the role of artillery in and since the World War" (continued). This instalment deals with the amount of ammunition to be carried per gun, fire-tactics, fire-control and organization of the artillery, and tactical and strategical mobility. A very interesting article.

There follows the usual military literary review.

Militär-wissenschaftliche Mittellungen. March.

"Guerilla Warfare." Lieutenant Balck gives some account of various forays and skirmishes during the World War in theatres in which there was no continuous trench-line, and summarizes the principles on which such enterprises should be conducted.

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April.

"The development of artillery ranging and fire tactics since the beginning of the War."

Heerestechnik. **March, 1923.**

The articles by Hauptmann Justrow (on the lives of gun and other firearm-barrels) and by Major Klingbeil (on fortifications in sand-dunes) are continued.

Dr. Koebzer, of the inspectorate of armament and equipment, writes on the climate of the (German) manœuvre areas and points out the importance of weather predictions to commanding officers both in manœuvres and in war.

Erich Kürth-Landwehr, a civil engineer of Cassel, sings the praises of the work done by German industry in connection with the war and suggests that the engineering industry was not given sufficient scope by the army. The Editor counters this assertion in a note following the article.

"The Splinter Effect of H.E. Shells." Hauptmann Justrow continues his contest with General Rohne on this subject, remarking that his last article in the *Art., Monatschefte* was interspersed with remarks by his opponent (the Editor of the *Art. Monatschefte*). The first instalment of Hauptmann Justrow's essay is devoted to dealing with General Rohne's criticisms, point by point, in a somewhat personal manner.

"The Winter 'Glider' School on the Wasserkuppe," by Fritz Stamer. The training of pilots in "gliding" during the winter.

Lt. Stammbach concludes his article on the repair of big iron bridges in the field.

The article on the 1920/21 report of the National Survey Office is also concluded.

Switzerland.

Revue Militaire Suisse. April, 1923.

Ludendorff's Strategy (concluded). Col. Lecomte.
Liaison between artillery and infantry. Col. Turrettini.

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PRINCIPAL ADDITIONS TO THE LIBRARY.

Churchill (Rt. Hon. Winston S.) The World Crisis, 1911-1914. London (Thornton Butterworth), 1923.

Wister (Owen) Neighbours Henceforth. London (Macmillan), 1923.

Hendrick (Burton J.) The Life and Letters of Walter H. Page. 2 Vols. London (Heinemann), 1923.

The Rifle Brigade Chronicle for 1922. London (Bale, Sons & Danielsson), 1923. (Presented by the Editor.)

Crooks (Major J. J.) Records relating to the Gold Coast Settlements from 1750 to 1874. Dublin (Brown & Nolan), 1923. (Presented by the Author.)

Herr (General). L'Artillerie. Ce qu'elle a été—Ce qu'elle 'est—Ce qu'elle doit étre. Paris (Berger-Levrault), 1923.

Parker (Capt. G. L.), R.G.A. Some Pitfalls of Army Accounts. London (Hugh Rees), 1923. (Presented by the Author.)

A Short History of the Royal Regiment of Artillery. London (Gale & Polden), 1923.

Foch (Marshal Ferdinand) The Principles of War. (Trans.) London (Chapman & Hall), 1918, and a quantity of German Military works. (Presented by Capt. E. S. Ettlinger, late R.A.)

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin belge des Sciences Militaires.—June, 1923.

The strategical deployment and the first operations of the Russian Army in 1914. Gen. Daniloff (late Quartermaster-General at Russian G.H.Q.).

A few further remarks on the principles of the use of artillery in battle. Gen. Hellebaut.

Concentration of fire, and manœuvre by fire. Major Dony.

France.

Revue d'Artillerie.—May, 1923.

Law of probabilities applied to artillery. (I.) Capt. Lhoste.

Impressions of Germany (Concl.). Major Graux.

Some methods of taking bearings by use of theodolite (Concl.). 2/Lieut. St. Lys.

Revue Militaire Générale.—May, 1923.

The break-through at Dobro-Polé (Concl.). Lt.-Col. Theodoroff.

Strategy and operations in the North. (VII). Capt. Kuntz.

Revue Militaire Française.—June, 1923.

Gen. Daniloff. The first Russian operations in 1914 (Concl.).

Lt.-Col. Tournes. Defence of a modern fort. (Concl.)

Maj. Doumenc. Power and mobility.

Germany.

Militär Wochenblatt. No. 31. 1st May, 1923.

The re-appearance of "Nauticus," the German yearbook on marine affairs, is announced.

The review of military politics by "Lucius Cincinnatus" is largely occupied with events in the Ruhr and their bearing on European politics. The writer sees little hope that any foreign country will help Germany, though he expatiates on the threat to the British Empire represented by French militarism and on the cooling of affection between the two countries.

"The Second Artillery Deployment" is continued. The advantages of grouping artillery under higher commanders than divisional artillery commanders are insisted on; unobserved map shooting is defended against critics; H.E. "Splinter" shells are preferred to gas-shells.

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The proposed reductions in the Swedish Army are reviewed.

Colonel Freiherr v. Weitershausen returns to the question of the infantry-gun. He regards gun-tanks armed with long-range guns of calibre not less than 75$^{m/m}$ as the solution.

No 32. May 15th, 1923.

General von Kühl reviews Colonel Boucherie's "Historique du Corps de cavalerie Sordet." On the whole he praises the book, which, he says, fails to show any foundation for the French claim to the superiority of their cavalry in the war, but condemns Sordet's tactics.

"The new Naval Base at Singapore" reviews the plan and its effects and expresses admiration for the long-sighted policy, which, "regardless of the limitations imposed at present by the French superiority on land and in the air," thus prepares for the future struggle with Japan.

A further article on the Infantry Gun replies to that published in No 29. The writer considers the 37$^{m/m}$ gun quite inadequate to the tasks involved.

About "Rapidity in Attack," by Lieut. Jünger. Methodical preparation and advance must alternate with irresistible dash in accordance with the requirements of the situation; the genius required for such a conduct of the attack must be inborn.

Heeres Technik. No 4.

1. Hauptmann Justrow's article on the lives of gun and fire-arm barrels is continued.
2. Instructions for removal of damaged tyres on M.T. vehicles.
3. Use of bridges by M.T.
4. The railways in the defensive battle of the Aisne.
5. The effect of H.E. splinters.

In the opinion of the author H.E. is so superior to shrapnel that the latter is not worth carrying.

6. Review of Vol. IV, Der Grosse krieg 1914/18. M. Schwarz

This volume deals with naval warfare.

Switzerland.

Revue Militaire Suisse. May, 1923.

Operations in Belgium, 6-15 August, 1914, of Sordet's Cavalry Corps. Col. Poudret.

Aviation and chemical warfare. Capt. Primault and M. Jacques.

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin belge des Sciences Militaires.—July, 1923.

Policy and Strategy. Col. Fastrez.

Concentration of fire, and manœuvre by fire. Maj. Dony.

France.

Revue d'Artillerie. June, 1923.

The defence of maritime frontiers. Col. Dumontet.

Law of probabilities applied to artillery. (Contd.) Capt. Lhoste.

Divisional artillery in attack. (Contd.) Col. Verguin.

Instructions to the rank and file on the natures and uses of ammunition. Capt. Mougin.

On time series. Maj. de Montjamont.

Revue Militaire Générale.—June, 1923.

German mentality. Georges Blondel.

Colonial warfare. Morocco as a war zone. Capt. R. Baillot.

War of the future. Maj. Paquet.

Revue Militaire Française. July 1923.

The action of the coalition in the East (1914—1916). Lt.-Col. Oehmichen.

Electrification of the French railways, and national defence. Capt. Barbillion.

Notes on Aviation. (I).

Power and mobility. (Contd.) Maj. Doumenc.

Agricultural production in Germany. Maj. A. de Tarlé.

The lesser entente. Maj. Paquet.

Germany.

Militär Wochenblatt, No. 33, 10th June, 1923.

Lucius Cincinnatus reviews the French Army Budget. He turns to the Ruhr occupation, which he sketches briefly and comments on incisively. He adds some details as to French aerial strength.

A lengthy article defends the pre-war German General Staff against criticisms by Professor Hans Delbrück, recently published.

Major Dr. Kretzschmann has an interesting review of General Le Hénaff's book "Le rôle militaire des chemins de fer." He emphasizes the military advantages of a state-owned railway system over a system owned by several private companies.

There are the usual short reviews of military and aerial events in various countries.

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No. 34, 25th June.

General von Kuhl discusses the battle of Montdidier, 8th August, 1918, in reference to Commandant Daille's book on this battle. The military-political situation in Russia is reviewed. The equipment of the army has improved. Nationalists and communist elements are to be found in the army, the latter in a majority. The various Soviet Republics have now definitely joined in a Federal Russian state. In foreign politics, Russia is seeking peace on all sides.

General von Altrock reviews Colonel Landfried's book "Der Endkampf in Mazedonien 1918." He touches on the difficulties with which the German Staff and troops had to contend and pays tribute to the heroism of the Serbs.

An article explains some details of the new scales of pay and pensions necessitated by the cataclysmic fall of the Mark.

Heeres Technik, No. 5, May, 1923.

The influence of a dazzling glare on the use of field-glasses. Notes on the armament of a modern Company of Infantry. A survey detachment on the Eastern front in the first one-and-half years of war. No. 6.

Simplified book-keeping for military stores.

Notes on the system on which the new training and other manuals have been written.

The experiences in war and peace of the use of concrete in permanent and emergency fortifications. Maj. Klingbeil.

The railways in the defensive battle of the Aisne. A classic example of the use of railways for tactical purposes. Major Dr. Kretzschmann.

Mechanically drawn artillery by Capt. Buschmann.

A review of the systems tried and the desiderata.

Militär-wissenschaftliche Mitteilungen.—June.

General von Kuhl "Peace-time training and war-experience."

Artilleristische Monatshefte. No. 197/198, May/June, 1923.

von Eberhard's technical article on ballistics at long ranges is continued.

The article on the development and rôle of the Artillery during and since the World War is concluded. This instalment deals with observation, reconnaissance, communications, and auxiliary services of the artillery; special guns (Trench Mortars, Infantry guns, anti-tank and anti-aircraft artillery).

"The question of Tanks" by Major Buch deals with an article on this subject in Nos. 351—357 of the *Revue d'infanterie.*"

Switzerland.

Revue Militaire Suisse.—June, 1923.

Operations in Belgium, 6—15 August, 1914, of Sordet's Cavalry Corps. (Contd.) Col. Poudret.

Co-operation between cavalry and the other mobile arms.

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin Belge des Sciences Militaires.—August, 1923.

Policy and Strategy. (II). Col. Fastrez.
Concentration of, and manœuvre by fire. (Contd.) Maj. Dony.

France.

Revue d'Artillerie.—July, 1923.

Essay on preparation of fire. Maj. Menjaud.
The defence of maritime frontiers. Col. Dumontet.
Flank observation. Maj. Benoît.
Law of probabilities applied to artillery. (Contd.) Capt. Lhoste.
Use of air photography for instruction of artillery rank and file. Maj. Appfel.

Revue Militaire Générale.—August, 1923.

Tactical employment of automatic infantry weapons in attack. Lieut.-Col. Cour.

A flanking manœuvre in the war of 1914-1918 : The 1st Colonial Corps in the Spring of 1917. Major Charbonneau.

An introduction to historical study. Army organisation and tactics. Maj. Pamard.

Strategy and operations in the North. (Concl.) Capt. Kuntz.

Revue Militaire Française.—August, 1923.

The action of the coalition in the East (1914-1916). (II.) Lt.-Col. Oehmichen.
The use of smoke in war. Col. Chédeville.
The "break-through" of May 9, 1915. in Artois. Capt. Lefranc.
The future of Tanks. Lt.-Col. Velpry.
Notes on aviation. (Concl.)
An encounter battle.—Ethe. 22 August, 1914. Maj. Grasset.

Switzerland.

Revue Militaire Suisse.—July, 1923..

Special number.—The Sonderegger incident. (Retirement of the Chief of Staff, Col. Sonderegger, for political reasons.)

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Germany.

Militär Wochenblatt, No. 1, 10th July, 1923.

"Some remarks on the strategic employment of the German Cavalry in the World War," by General of Cavalry Baron von Gebsattel.

One of the causes of Germany's failure to win the war was the faulty use made of her cavalry. The General cites three examples. In the advance in the west in 1914, all the cavalry should have been grouped on the right wing (6 Cavalry Corps) as soon as touch had been gained with the enemy.

After the break-through at Gorlice, one or two Cavalry Corps should have been available to exploit the victory and cut off the Russians in the Carpathian passes.

The use of a strong cavalry force (one or two Cavalry Corps) against Amiens in the Spring of 1918 would have led to the capture of that city and final victory.

Military Political Review of Switzerland refers to the retirement of the Chief of Staff, Colonel Sonderegger, on account, it is said, of the refusal of the Swiss Parliament to provide adequate funds for the army.

A "Technical Review" enumerates articles in publications of many countries on explosives, Very lights, concealment of gun-flash, the value of permanent fortifications, pontoons, tractors, etc.

Military Political Review of Poland and the Baltic States.

The Polish army was raised to full peace strength in January and February by the incorporation, for the first time, of the Galician recruits. The strength was temporarily exceeded by the addition of reservists, called up for eight weeks' training, and of volunteers.

The Army Act was brought before the Polish Sejm in May. It provided for two years' service with the colours, eighteen in the Reserve, and twelve in the Landsturm.

The Polish Air Force consists at present of 15 flights, which are being made up to 15 aeroplanes each.

There are only limited facilities in Poland for producing war material and no guns are made.

The heated political controversies between Left and Right have less effect on the army morale than formerly.

Military expenditure amounts to 27% of the Budget. The Government hopes to make the Budget balance by 1926.

No. 2, 25th July, 1923.

General von Cramon advocates steadfast resistance to France.

"The Russian deployment in August, 1914," by General von Kuhl, reviews the articles by General Danilow (in 1914 Quartermaster-General of the Russian Army) in the "Revue militaire française" of May and June, 1923.

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Military Political report from Italy (January to May, 1923) is on the whole favourable to Mussolini's reforms in the army and of the national finances.

"The question of the infantry-gun," by Hauptmann Pfeifer (first instalment) recapitulates and comments on previous articles on this subject.

Heerestechnik, July, 1923.

Hauptmann Justrow's article on the life of the barrels of guns and small arms is continued.

Baumgart describes the organisation of the Civil Survey Department which has replaced the former Military Survey Department.

Major Dr. Kretzschmann concludes his article on the use of the railways in the battle of the Aisne.

Hauptmann Justrow complains that the Brockhaus Lexicon of War celebrities neglects the technical experts, who had such an important share in the war.

General v. Borries reviews the 9th volume of Schwarte's book "The Great War, 1914-1918," which deals with the supply, the medical, and the veterinary services.

General Schwarte continues his article on the capture of Novo Georgievsk.

Regierungsrat Koerner concludes his account of a survey unit on the Eastern front during the first one-and-a-half years of the war.

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PRINCIPAL ADDITIONS TO THE LIBRARY.

Gullett (H.S.). Official History of Australia in the War of 1914-18. Vol. VII.—Sinai and Palestine. Sydney (Angus & Robertson), 1923.

(Presented by the Publishers.)

Grasset (Commdt. A.). La Guerre en action. Un combat de recontre Neufchateau. Paris (Berger-Levrault), 1923.

(Presented by the Publishers.)

Kuntz (Capitaine). La Psychologie du G.Q.G. Italien sous le General Cadorna. Paris (Chiron), 1922.

(Presented by Lieut.-Col. E. Clayton, O.B.E., R.A.)

Gettins (Lieut.-Col. J. H.). Some Military Conversations and Official Comunications in French. London (Gale & Polden), 1923.

(Presented by the Publishers.)

Enock (Arthur Guy). The Problem of Armaments. London (Macmillan), 1923.

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Pierrefeu (Jean de). G.Q.G. Paris (G. Cres & Cie).

Egerton (Hugh Edward). British Colonial Policy in the XXth Century. London (Methuen), 1922.

Pollard (A. F.). The British Empire. Its Past, its Present, and its Future. London (League of the Empire), 1909.

Muir (Ramsay). A Short History of the British Commonwealth. 2 Vols. London (Philip), 1920-22.

Fendall (Brig.-Genl. C. P.) The East African Force, 1915-1919. London (Cassell), 1921.

Gooch (G. P.). History of Modern Europe, 1878-1919. London (Cassell), 1923.

Oman (Charles). A History of the Peninsular War. Vol. VI.—Sept. 1st, 1812—Augt. 5th, 1813. Oxford (Clarendon Press), 1922.

Stewart (Col. H.). The New Zealand Division, 1916-1919. Vol II.—France. Auckland, N.Z. (Whitcombe & Tombs), 1921.

Powles (Lieut.-Col. C. G.). The New Zealanders in Sinai and Palestine. Auckland, N.Z. (Whitcombe & Tombs), 1922.

Whitton (Lieut.-Col. F. E.). The Decisive Battles of Modern Times. London (Constable), 1923.

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Robinson (Howard). The Development of the British Empire. London (Constable), 1923.

Taylor (Frank). The Wars of Marlborough, 1702-1709. 2 Vols. Oxford (Basil Blackwell), 1921.

Golovin (General N.). The Problem of the Pacific in the Twentieth Century. London (Gyldendal), 1922.

McDonald (J. Ramsay). The Government of India. London (Swarthmore Press).

Haldane (Lieut.-Genl. Sir A. L.). The Insurrection in Mesopotamia, 1920. Edinburgh (Blackwood), 1922.

Seligman (V. J.). The Salonica Side-Show. London (G. Allen & Unwin), 1919.

Lucas (Sir Charles). The Empire at War. Vol. I. Oxford (University Press), 1921.

Steel (Col. J. P.). A Memoir of Lieut.-Col. Edward Anthony Steel, D.S.O., R.H.A. & R.F.A., 1880-1919. London (Simpkin, Marshall), 1921.

(Presented by Col. J. P. Steel, F.R.G.S., late R.E.)

Sykes (Maj.-Genl. Sir F. H.). Aviation in Peace and War. London (Arnold), 1922.

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PART II.

NOTES ON FOREIGN JOURNALS.

France.

Revue d'Artillerie.—August, 1923.

Concentration of fire in defence. Capt. Courbis.

An apparatus for imitating bursts of shell on a miniature range. Maj. Mercier.

Law of probabilities applied to artillery. (Contd.) Capt. Lhoste.

Study on the employment of divisional artillery in defence.

This is a reproduction of a scheme worked out at the Artillery School (Centre d'Etudes tactiques d'Artillerie) at Metz.

In this number the data of the problem are given and an exposé of the general situation with the defence scheme of a division. In the next number, under the heading "Annexe to the defence scheme of the 201st Infantry Division (artillery)," the solution arrived at in so far as the C.R.A. of the division is concerned, will be given.

The solution is that of Colonel Berniolle, a student at the Centre d'Etudes at the time.

Revue Militaire Générale.—May and June, 1923.

Anyone interested in the relationship between Strategy and Policy might be interested in an article by Capt. de Gaulle entitled "The fatal quarrel between a Chancellor and an Admiral."

de Gaulle states that a first principle of war, is that the Political Conduct of a War is the business of the Cabinet, and that those responsible for the use of the military means of making war, do so under the orders of the Cabinet.

Germany in the days of Bismarck and von Moltke observed this law of action and were duly rewarded.

Not so the leaders of 1914-1918. The Naval Secretary of State was entirely opposed to the Chancellor's plans and used every means in his power to impose his will on the Kaiser and the Cabinet.

The article deals with the declaration and conduct of submarine warfare. It goes into at great length the personal enmity between Tirpitz and Bethmann Hollweg, and the intrigues resulting therefrom. However, personalities apart, the article is very interesting.

Revue Militaire Française.—Sept. 1923.

Gén. Niessel. Air manœuvres. Weekly manœuvres carried out near Châtoureaux, the station of the 3rd Regiment de Chasse.

Particularly interesting as regards umpiring.

Maj. Grenier. At German General Headquarters during the War.

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This is a review of Colonel Bauer's book "Der grosse Krieg in Feld und Heimat." As is the case with so many books of the war it is mainly personalities, but there is a great deal to learn from this short resumé of a 323 page book. Col. Bauer is a faithful disciple of Ludendorff's and of course dwells on the theory that the German army was not beaten, but that it was "stabbed in the back."

Bauer claims to have been largely instrumental in the removal of Moltke and Falkenhayn from their appointments.

This staff officer having at last got the chief he wanted, Ludendorff, then turned to intrigue against the civil authorities.

Bauer shows up all the mistakes made by the Germans.

But what matter? His book is a politician's book written to restore the confidence of the German people in the party who had led them to war and defeat.

Maj. R. Prioux. Three British Cavalry operations. Cambrai, Amiens, le Cateau.

Maj. Grasset. An encounter battle.—Ethe. 22 Aug. 1914. (II).

Germany.

Militär Wochenblatt. No. 3, 10th August, 1923.

The second volume of the official German history of the "Cruiser Warfare" is reviewed. It deals with the adventures of the various free-lance cruisers.

Leutnant Ernst Jünger writes on the new German Infantry Training Manual. He remarks that, in spite of the limitations imposed by the Treaty of Versailles, the simple pre-war infantry arm has now been complicated by the addition of, or increase in engines of war such as trench-mortars and machine-guns, while other armies have tanks, infantry-guns, etc.

Hauptmann Pfeifer's article on the question of infantry-guns is concluded. He considers that each battalion should not only have two (7·5 cm.) guns for dealing with machine-gun nests, but also six to eight (3·7 cm.) anti-tank guns. The two former guns might be replaced by trench-mortars with a muzzle velocity of 650—800 f.p.s. He concludes with the remark that modern science has always been equal to tactical requirements, when tactical desiderata have been accurately and clearly recognised.

The usual space is devoted to notes on the variations in pay and pensions.

No. 4. 25th August, 1923.

Military politics in Great Britain by Lucius Cincinnatus. A realization that Great Britain has reduced her fighting forces to the pre-war standard too rapidly is beginning to dawn, but measures to counter the expansion of French imperialism are still in their extreme infancy. The teaching of history prevents the people from being depressed by the realization that they depend on the helplessness and jealousies of others rather than on their own strength. The reductions effected in the budget are bound to affect the efficiency of the forces, unless money was being mis-spent previously.

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The projected increase in the Air Force is referred to. The writer scoffs at the statements in the English Press that this increase is not directed against France. After a reference to the navy, follows a short survey of events in the Empire and protectorates.

"The Military Lessons of the Great War". A review by General von Kühl of the second edition of the book of this name edited by Schwarte, which he describes as a successor to Löbell's "Army and War Annual". It collects the lessons deduced from the war by the Chief military powers of the world.

"Modern Cavalry". A précis of a lecture by Colonel Brudinok (Austrian) on the use and training of cavalry.

Heerestechnik, August, 1923.

Hauptmann Justrow's article on the life of barrels of fire-arms is continued. It will eventually appear in book form.

Dr. Kölzer writes on the influence of temperature and wind on the travel of sound in the atmosphere.

Hauptmann Fries gives some particulars of a lorry with a big floor area, drawn by a motor, which carries 10 tons up a slope of 1 in 6 and for which various advantages and economies are claimed. Gen. Rohne returns to the question of shrapnel versus H.E.

"Geology in the World War" a sketch of the work done by geological detachments in the German army during the war.

"Material or Morale" by Friedrich von Taysen, is an essay on the principles of war current in the French army. After remarking that the re-organization of the French army has been said to constitute a victory of material over effectives or over morale, the writer enters on an interesting discussion of some of the features of the French manuals "Instruction provisoire sur l'emploi tactique des grandes unités" and Infantry Regulations, and of various essays by French officers. He illustrates his remarks by references to incidents in the war 1914-1918. After a general discussion of the principles involved, he deals with artillery, tanks, and aerial forces.

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PART II.

NOTES ON FOREIGN JOURNALS.

France.

Revue d'Artillerie. Sept. 1923.

Why we do not want the "decigrade".—Lt.-Col. Pagezy.

This article deals with the unification of the division of angles, and the advantages of the *millième* over the *décigrade* particularly regarding anti-aircraft artillery.

Solution of the tactical problem on employment of divisional artillery. Col. Berniolle.

Application of astronomical methods to the determination of direction. Lt. Riveau.

The Jobin theodolite.

Concrete cases. Col. Cambuzat.

Molecular changes in metals. Maj. Fraichet.

Revue Militaire Française.—Oct. 1923.

An encounter battle.—Ethe (22 Aug. 1914) III. Maj. Grasset.

Aerial photography (I). Lt. C.-M. Goussot.

The contest with enemy intelligence services. Maj. Mabille.

The Turkish Offensive of 1922. Maj. Poidevin.

Revue Militaire Générale.—Sept. 1923.

The encounter battle. Lt.-Col. Alléhaut.

A flanking monœuvre in the war of 1914-1918 :the first Colonial Corps in the spring of 1917. (Contd.) Maj. Charbonneau.

A manœuvre of Kuroki. Réginald Kann.

Switzerland.

Revue Militaire Suisse.—Sept. 1923.

Strategical heresies. Col. Lecomte.

A criticism of two French books. Jomini's theory that "to strike with the maximum force and with the greatest energy, at the right moment, and at the decisive point" can be no longer regarded as an unchangeable principle of war.

Modern conditions may be said to have changed this to :

"Exhaust the enemy by partial attacks, and chooose the right moment to attack his last reserves with the utmost vigour."

Germany.

Militär Wochenblatt. No. 5. 10th September, 1923.

General von Kuhl reviews Général Boullaire's book "Historique du 2e Corps de cavalerie". He contests the claim that the German cavalry avoided the French cavalry in 1914.

The political situation and the state of the military forces in Poland and the Baltic States are reviewed.

There is a short précis of Colonel Marine's article in the *Revue d'Artillerie* on aeroplane bombs and bombing apparatus and the possi-

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bility of artillery shells discharging a smaller shell at the highest point of their trajectory.

No. 6. 25th September, 1923.

General von Altrock, paints in the darkest colours, the helpless position of Germany amidst a ring of militarist countries.

Major Wolfgang Muff, urges the importance of a thorough training in educational methods for officers in order that these may play their rightful part in educating their men.

The military-political situation in the United States of America is reviewed.

General von Zwehl gives a précis of a British gold medal essay on "the war of the future," and comments on the absence of reference to strategy and tactics, length of the struggle, propaganda, etc. He remarks that the fact that the essay deals almost exclusively with armament, the technical side of warfare, and organization, is typical of the British point of view. (This apparently refers to Major Chenevix Trench's essay in "The Journal of the R.U.S.I.," May, 1923).

The question of the infantry-gun is dealt with in a final article. The writer points out that, for anti-tank defence, the projectile must not only pierce the tank armour, but must burst inside with sufficient force to put the tank out of action. In deciding on the proportion of infantry guns to be allowed, it must be borne in mind that the gun crews must be picked men.

Wissen und Wehr. August, 1923. (Quarterly).

Two letters on strategy by Clausewitz, published by Dr. Hans Rothenfels of the German Reichs Archives. In these letters, written in 1827, Clausewitz discusses certain features of strategical problems which pre-supposed a war between Prussia on the one side and Austria and Saxony on the other.

In "The British Higher Command 1916—1918," Hauptmann Nagel gives a précis of Dewar and Boraston's book "Sir Douglas Haig's Command." He discovers a surprising allegation that the British Empire began the war to completely subjugate Germany and therefore 'the British Army' would not think of a 'peace by arrangement' in 1917.

"Comradeship in work and community of spirit" by Major Muff. The present long-service in the German Army gives opportunity for developing comradeship between officers and other ranks, which was lacking under the short-service conscriptive system.

Major Osterroht writes on Volume I. of the new Infantry Regulations.

"Napoleon's influence on the spirit and will-to-victory of the Army" by Rittmeister Weisenberger, deals with Napoleon's propaganda methods in his armies and, to some extent, amongst the civil population. A very interesting article for students of military psychology.

W. Zerben writes on the present organization and state of the Red Army.

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PRINCIPAL ADDITIONS TO THE LIBRARY.

Kirkaldy (A.W.) and A. D. Evans. The History and Economics of Transport. London (Pitman), 1920.

Fortescue (Hon. J. W.). A History of the British Army, Vol. XI—1815 to 1838. London (Macmillan), 1923.

Moberly (Brig.-Genl. F. J.). History of the Great War. The Campaign in Mesopotamia, 1914-1918. Vol. I. London (Stationery Office), 1923.

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Pierrefeu (Jean de). Plutarque a menti. Paris (Grasset), 1923.

Cutlack (F. M.). Official History of Australia in the War of 1914-18. Vol. VIII—The Australian Flying Corps. Sydney (Angus & Robertson), 1923.

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(Presented by the Author.)

Milne (S. M.). The Standards and Colours of the Army, 1661 to 1881. Leeds, 1893.

Krey (August C.). The First Crusade. Princeton, 1921.

Stern (Lieut-Col. Sir A. G.). Tanks, 1914-1918. The Log-Book of a Pioneer. London (Hodder & Stoughton), 1919.

Dewar (George A. B.). The Great Munition Feat, 1914-1918. London (Constable, 1921.

Raleigh (Walter). The War in the Air. Being the story of the part played in the Great War by the Royal Air Force. Vol I. Oxford (Clarendon Press), 1922.

Shakespear (Lieut.-Col. John). Historical Records of the 18th (Service) Battalion Northumberland Fusiliers (Pioneers). Newcastle-on-Tyne. 1920.

Barlow (Col. Sir H. W. W.). Regulations of the Danger Buildings, Royal Laboratory, 1903, 1905, 1908, 1914, 1916.

(The above and a number of other works presented by Lieut.-Col. J. H. Leslie.)

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Patiala and the Great War. A Brief History of the Services of the Premier Punjab State. London (Medici Society), 1923.
(Presented by Publishers.)

Scott (Major-Genl. Sir Arthur B.). History of the 12th (Eastern) Division in the Great War, 1914-1918. London (Nisbet), 1923.
(Presented by the Author.)

Neame (Bt. Lieut.-Col. Philip). German Strategy in the Great War. London (Arnold), 1923.
(Presented by the Publishers.)

Callwell (Major-Genl. Sir C. E.). Stray Recollections. 2 Vols. London (Arnold), 1923.
(Presented by the Publishers.)

Imperial Strategy. By the Military Correspondent of "The Times." London (Murray), 1906.
(Presented by Col. F. M. Rickard.)

Catalogo General Museo de Artilleria. 2 Vols. Madrid, 1909-1911.
(Presented by Major M. C. Maunsell, late R.A.)

Pilcher (Major-Genl. T. D.). War according to Clausewitz. London (Cassell) 1918.

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FOREIGN NEWS.

FRENCH AUTUMN MANŒUVRES, 1923.

A red force (of two armies) is in pursuit of a blue force (of one army). Contact has been lost.

The *6th Cavalry Division* was one of the mobile detachments in advance of the red force. Its task was to obtain touch with the blue force.

The *2nd Colonial Division* consisting of various units brought together for the manœuvres, and who had not worked together, was one of the divisions of the blue force who had orders to stand and stop the advance of the enemy.

The 6th Cavalry Division represented a "light division" and had also at its disposal a group of motor machine-guns, some tracked vehicles, a tank unit, and an observation flight.

The Colonial Division represented a "*division de ligne*" and had also : cavalry machine-guns, a divisional reconnaissance group, and anti-aircraft artillery. The divisional reconnaissance group is really the old divisional squadron, reinforced by a cyclist company, and some motor machine-guns.

These were the only troops who actually took part in the manœuvres. The object of manœuvres was to test :—

(1) The work of a light division in following up and obtaining contact with the enemy.

(2) The defence dispositions of an infantry division covering a very wide front, and having no time to construct organised defences.

Finally the use made of new weapons by the two division.

The work of the Cavalry is severely criticised by the French correspondent in the *Revue militaire Suisse*. He says that the cavalry commanders not only displayed woeful ignorance in the use of modern weapons, but also in cavalry work. Horses tired very quickly, and the very smallest resistance held up the advance troops and made them deploy.

"A light division mainly consisting of horsemen perhaps might fight a rearguard action; it is quite certain that it will not be capable of forming an efficient advance guard in a pursuit. One might almost think that the object of the manœuvre in the Rhine Valley was to show the uselessness of the *light division*, as constituted in our new army organisation."

Regarding the *line division*. Though this was an improvised division consistng of Frenchmen, Annamites, Senegalese, and Malagasies collected from the XV Army Corps area, they worked well together. The front they covered was 25 kilos—they occupied their positions quickly, and finally carried out a manœuvre of breaking off a battle by night, in bad weather, efficiently. The divisional reconnaissance group also worked well constantly holding up the cavalry in pursuit, and forcing them to bring up guns, etc. The tanks were badly used, and their personnel showed lack of training.

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NOTES ON FOREIGN JOURNALS.

France.

Revue d'Artillerie. Oct. 1923.

Reflexions in mathematics. Gen. Vouillemin.

Note on the artillery battle. Lt.-Col. Mayoux.

Col. Mayoux points out that since the war, at courses, in exercises on the ground and on the map, and in many publications, the questions concerning the organisation and employment of divisional artillery have been fully discussed. He proposes in this article to discuss the artillery struggle which is the principal rôle of the *corps artillery*.

In this article he takes firstly the case of position warfare when the enemy artillery has been in position, and has fired enough to be more or less located. Secondly moving warfare when nothing is known beforehand about the enemy artillery.

Aerial ballistics. Major Bloch.

Calculations for obtaining the line from a flank observation station.

The concrete case (II). Col. Cambuzat.

Miscellaneous information.

Italy: Tanks.—Italy having in August, 1915, commenced to study tank manufacture, at first was inclined to consider French and English models. Since 1921, light tanks of an Italian pattern, type Fiat 3,000, weighing 5 t., armed with two coupled machine-guns in a revolving turret, 45 h.p. motor, maximum speed 16 km. per hour.

In an Austrian journal it is stated that the Ansaldo factories have produced a new light tank, while the Fiat works are experimenting with a tank armed with a howitzer.

Revue Militaire Générale. Oct., 1923.

Ludendorff's strategy on the Russian front (I). Gen. Camon.

A flanking manœuvre: the First Colonial Corps in the Spring of 1917. (Concl.) Maj. Charbonneau.

The operations in Transylvania, Sept.—Oct., 1916. Capt. Salmon.

This article deals with the Roumanian offensive in Transylvania, the battle of Hermanstadt, operations at Kronstadt. Having described the fortnight's operations Capt. Salmon arrives at the conclusion that "such an imprudent strategy that expends reserves in the first battles, succeeded on the eastern front, owing to the inertia of the Russians and the inexperience of the Roumanians."

Revue Militaire Française. Nov. 1923.

An encounter battle.—Ethe (22 Aug. 1924) IV. Maj. Grasset.

Aerial photography (II). Lt. C.-M. Goussot.

Principles of manœuvre. Col. Lemoine.

Our theory of 1914 on the conduct of operations, and the lessons of the war (I). Col. Brossé.

The Military Month. The Autumn manœuvres in the Rhone Valley.

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Italy.

Revista di Artiglieria e Genio. Sept. 1923.

The Namur and Antwerp fortifications and the effect of the bombardments in 1914.

Belgium.

Bulletin belge des Sciences Militaires. Nov. 1923.

Notes on "Artillerie portée"—p. 1281.

Germany.

Militär-Wochenblatt. No. 7, dated 10th October, 1923.

1. *The Military Political Review of South East Europe. January to end of June, 1923*

The article briefly reviews the efficiency of the armies of Czecho-Slovakia, Austria, Hungary, Roumania, and Yugo-Slavia. The army of the former is comparatively efficient owing to the efforts of the French Military Mission. The Austrian Army is said to have improved and is trained exactly on the German model. The Hungarian Army is as good as it ever was. The Roumanian Army is said to be completely inefficient, while the forces of Yugo-Slavia, although adequate from the point of view of effectives are deficient in munitions and equipment.

2. *"For the Military Professor," by Major Wolfgang Muff. Part II.*

These articles should be of interest to aspirant teachers to the Staff and Artillery Colleges. The author feels that the good military teacher must be a finished Psycho-Analyst.

3. *Aerial Manœuvres in France.*

This article is chiefly concerned with the system of umpiring at these manœuvres.

4. *Geographical principles and National spirit affecting the destiny of peoples, by Lieutenant-General von Altrock.*

A brief historical survey of the history of the Germanic peoples.

Precis of Contents of Militär-Wochenblatt, No. 8, dated 25th October, 1923.

1. *"The Franco-British Offensive in the year 1915," by General of Infantry von Kuhl.*

A favourable review of the 11th Volume of General Palat's "Les offensives des 1915."

2. *Military policy of Belgium.*

A short and not unfavourable review of the training of the Belgian Army, contrasting it with the economic and financial position of the country, and pointing out that Belgium is completely under the domination of France.

3. *"For the Military Professor."* Conclusion of this series of Articles.

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4. *The War of lost opportunities.*

Review of Major-General Hoffman's book of this title.

5. *Douaumont, 1916.*

Extract from a book which will shortly appear entitled "Battles of the World War." Its main object would seem to be to underline the horrors of battle.

Precis of Contents of Artilleristiche Monatshefte. No. 199/200, July/August, 1923.

1. *Lieutenant-General Rohne on "Shooting with Shrapnel and High Explosive."*

The article contests that the late war was "the death of Shrapnel," but is of opinion that both field guns and field howitzers should carry a large proportion of shrapnel in the future and that the burning composition fuze should be replaced in all types of ordnance by a clockwork time fuze.

2. *Major Buch on the Tank Question.*

The second of two articles leading up to the conclusion that "however well tanks be constructed and whatever may be their performance in the future they will have little, if any, success when they meet troops of the quality of the German Army of 1914."

3. *Lieutenant-General Rohne. Contributions to the study of the light field artillery weapon of the future.*

The first of two somewhat technical articles which resolve themselves into the contest of weight of piece and carriage v. range and weight of shell.

4. *Military Notes.*

(a) On the strategic value of Strassburg.

(b) On the attachment of infantry and cavalry officers to artillery.

Precis of Contents of Artilleristiche Monatshefte, No. 201/202, September/October, 1923.

1. *Continuation of a paper on "Ballistics at long ranges."*

A highly technical paper consisting entirely of figures and mathematical expressions.

2. *Conclusion of Lieutenant-General von Rohne's article—"Contributions to the Study of the Light Field Artillery Weapon of the future."*

3. *Military Notes.*

The position of the United States vis-à-vis England.

Precis of Contents of Heerestechnik, No. 9, September, 1923.

1. *Continuation of Captain Justrow's articles.—Theoretical observations on the life of Gun, Trench Mortar, Rifle, and Pistol Barrels.*

These articles have already appeared in book form.

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2. *Dr. Kolzer.—Influence of Temperature and Wind on the dispersion of sound in the atmosphere.*

3. *Dr. Gretsch. Anti-Aircraft Defence.*

An interesting article in which the characteristics and capacity of machine-guns, A.A. guns of small and large calibre, and the various types of aircraft are considered with a view to the defence of armies by day and night.

4. *Surveyor Lips. A new form of Relief Maps.*

5. *Major Oswald Kruger. The influence of nitrogen on the walls of gun tubes during the passage of the shot down the barrel.*

The writer is disposed to think that this nitrogen is by some means absorbed by the metal of the tube which thus becomes more and more brittle.

6. *Major Klingbeil. River Battles.*

The writer points out that the geographical provision of the Treaty of Versailles has made the crossing of a river in face of the enemy inevitable to any German Army in the next war. In consideration of this therefore it becomes one of the most important subjects for the training of the Reichswehr.

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PART II.

NOTES ON FOREIGN JOURNALS.

France.

Revue d'Artillerie. Nov. 1923.

The tactical paper set at the last examination for admission to the *Ecole supérieure de guerre.* Col. Mussel.

This article is the reasoned solution of the scheme set and is written to assist young officers working for admission to the French Staff College. The paper is set in two parts. Part I gives the following data :—

I. General situation. An army corps of three divisions (1st Div. on right, 2nd on left, 3rd in reserve) is part of an army moving N. to get into touch with a hostile force. Information from the air, and from mounted men captured, gives information as to the enemy's whereabouts.

II. Composition and situation of the 2nd Division.

III. Orders by G.O.C. 2nd Division. Five and a half hours were allotted to answering the following questions :—

(1) Write orders by the G.O.C. Infantry of 2nd Division detailing an advanced guard, and allotting its tasks in accordance with the G.O.C. Division's orders.

(2) Give the C.R.A's orders (movement of groups, routes, etc.).

(3) Mark on a diagram to scale, the location of groups of field guns and 155 Hows. when the head of the main body has passed a certain line.

Distinguish between groups in action from groups on the move. (The position of the advanced guard is given.)

(4) Detail the liaison established on the morning following between (a) advance guard commander and corps cavalry; (b) divisional and advance guard commanders; (c) divisional and corps commanders; (d) divisional commander and commander of division on his right; (e) field artillery of main body and the advance guard.

Before commencing his solution Col. Mussel points out the most general faults made by beginners, these being (a) not carrying out the task allotted; (b) interference with the work of subordinate commanders; (c) basing a more or less logical plan on the action of the enemy, and working out the problem on that, rather than the allotted task; (d) insufficient study of the terrain; (e) detailing the same unit for too many tasks; (f) too rigid adherence to training manuals; (g) adopting a plan and not conforming to it when writing orders.

Part II gives the situation of the division at 10.30 hours on the following day, and an hour and a half is allowed to give the orders of the advanced guard commander for the capture of a certain geographical feature.

This is a very instructive article and a map is provided.

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Aerial ballistics. (Concl.) Maj. Bloch.
Note on the artillery battle. (Concl.) Lieut.-Col. Mayoux.
German anti-aircraft artillery. Maj. Vauthier.
Flank observation. Maj. Menjaud.
Miscellaneous notes.—Gun and m.g. on Kégresse tracked carriage with photograph.

Revue militaire générale. Nov. 1923.

German methods of infantry combat. Major Pujo.
This commences a series of articles; it is very interesting and illustrated by diagrams.
Ludendorff's strategy on the Russian front. (II.) (Lodz, 11-20 Nov., 1914.) Gen. Camon.
A flanking manœuvre: the First Colonial Corps in the spring of 1917. (Concl.) Maj. Charbonneau.

Revue Militaire Française. Dec. 1923.

Aeroplane manœuvres. Gen Niessel.
Principles of manœuvre. Col. Lemoine.
Old documents and present ideas. Col. Revol.
An encounter battle.—Ethe (22 Aug. 1914). (Concl.) Maj. Grasset.
Our theory of 1914. (Concl.) Col. Brossé.
The evolution of the Monroe doctrine, and pan-Americanism. Maj. de Tarlé.

Germany.

Militär Wochenblatt. No. 10. 25th November.

1. *Germany as the World's Enemy.*

A propaganda anti-French article. Military political review of Soviet Russia; an interesting paper on the Russian army, on which the writer draws the conclusion that certain units of the Soviet troops are very good but that the lack of uniformity of training and equipment throughout the army, together with the almost complete absence of an efficient air force, renders the Russian forces unsuitable to take part in a Western-European war at the present moment.

2. *Break Through at Brzeziny, November 24th, 1914. By General von Altrock.*

A review of the pamphlet of the regimental history of I.R. 231, of interest to students of the 1914 campaign on the Eastern front.

3. *Military Situation in the Far East after the Japanese Catastrophe.*

The writer draws the conclusion that although fairly damaged Japan is still a danger. He feels that this is proved by the continuance of British policy in the fortification of Singapore and the "World

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Propaganda Cruise" of the British Fleet. He also thinks that the Dutch Government is still frightened of Japanese aggression against the Netherlands East Indies.

4. *Infantry Tactics in the light of the new Infantry Training of 26.10.23.*

A detailed review of this training manual.

5. *Delaying Action. No. 2.*

Conclusion of the article of the same title in previous issue.

Militär Wochenblatt. No 9. 10th November.

1. *The Twilight of the Reichswehr.*

A gloomy article in which the writer describes the decline of the military profession in Germany in the course of the last few years.

2. *Military and Political Note from Switzerland.*

A sketch of the career of the retiring Chief of the General Staff—Colonel Sonderegger, and a short survey of the training carried out in the past year. The writer regrets that so many Swiss officers are being trained in French schools.

3. *"Men and Things." By Lieut.-Gen. von Altrock.*

A favourable review of this officer's autobiography of his life during the late war, which apparently contains some interesting character sketches of the Emperor Wilhelm, Moltke, Colonel Tappen, Chief of the operations section at G.H.Q., and other senior officers who served in the late war.

The author says little about Hindenburg or Ludendorff, but comments at length on General von Falkenhayn, whose Chief of Staff he was in 1915.

4. *Delaying Action. By Major W. Muff.*

The first of two articles on this subject in which the writer considers and compares the tactical ideas as expressed in the German and French training manuals.

Switzerland.

Revue militaire suisse. Nov, 1923.

This magazine has commenced publishing German news, under the heading "Chroniques et Nouvelles" which recently have only included France and Switzerland. In a footnote the editor says: "As the military situation in Germany is again becoming interesting the *revue militaire suisse* recommences the publication of German notes which will appear, unless anything unforseen occurs, quarterly. The Revue has approached an officer of high rank of the old Imperial Army on the subject, and has guaranteed him complete freedom of

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speech. What our readers wish to know is the military position in Germany, as seen by the Germans themselves . . . . " This instalment deals with the rebirth of the military spirit in Germany, or rather the sowing its seeds amongst people who had more or less lost interest in military affairs. Attention is drawn to the fêtes organised by the societies of ex-officers and soldiers (*Regiments-Vereine*), where thousands have been meeting in their former stations to show their patriotism and their fidelity to the black, white and red flag. In Bavaria the laying foundation stones of war memorials were made the occasions for marches past by the "*Kampf-verbände.*" In the societies of ex-service men (*Kriegsvereine*), patriotic military spirit increases daily. Students are imbued with the same spirit and would join the colours freely if the treaty of Versailles did not tie their hand. The "*Wehrverein,*" founded in 1913, and whose object is now to inspire the nation with military spirit, and to inculcate discipline in the youth, is redoubling its efforts. The socialists of all grades fear this awakening. Five years of uninterrupted misery have convinced the Germans that a people without military spirit is doomed to ruin. Bavaria at the present moment is more Prussian than the Prussians.

Bavaria is not in opposition to the *Reich*, but against its governing body where socialist influence predominates. The quarrel between Berlin and Munich is regrettable when at bottom the leaders are for empire where the national spirit prevails, as opposed to the international idea of the party of the extreme left who are under the influence of the Jews.

The *Reichswehr*, though small, is highly efficient. The officers are of the right class, desirous of serving in a big army, based on compulsory service.

The writer next gives the detail of the training of young men to become officers, which is much more thorough than before. When the rank and file serve for twelve years it is not intended that their officers should be commissioned too young.

Graduates who have matriculated take about four years from joining until commissioned as 2nd Lieutenants. Non-graduates about six years. Formerly the period was 18 months. So in future there will be no young officers of from 18-20 years. As a compensation for this they are well paid from the commencement of their service.

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PRINCIPAL ADDITIONS TO THE LIBRARY.

Churchill (The Rt. Hon. Winston S.). The World Crisis, 1915. London (Thornton Butterworth), 1923.

Rawlinson (A.). The Defence of London, 1915-1918. London (Melrose), 1923.

Lucas (Sir C. P.). The Empire at War, Vol. II. London (Humphrey Milford), 1923.

Wiebkin (Lieut.-Col. H. W.). A Short History of the 89th (Deptford) Divisional Artillery, 1915-1918. London (Berryman), 1923. (Presented by the Author.)

Fraser (Lovat). India under Curzon and After. London (Heinemann), 1911.

Gibbs (Philip). Realities of War. London (Heinemann), 1920.

Taylor (G. R. S.). The Psychology of the Great War. London (Martin Secker), 1915.

Lake (Harold). In Salonica with our Army. London (Melrose), 1917.

Gleichen (Brig.-Genl. Count. C.). The Doings of the Fifteenth Infantry Brigade. August 1914 to March 1915. Edinburgh (Blackwood), 1918.

Price (G. Ward). The Story of the Salonica Army. London (Hodder & Stoughton), 1917.

Osborne (Sidney). The New Japanese Peril. London (G. Allen & Unwin), 1921.

Grumbie (Sydney). The Pacific Triangle. London (Mills & Boon), 1921.

Willcocks (General Sir James). With the Indians in France. London (Constable), 1920.

L. F. R. Naval Guns in Flanders, 1914-1915. London (Constable), 1920.

Gillam (Major J. G.). Gallipoli Diary. London (G. Allen & Unwin), 1918.

Garvin (J. L.). The Economic Foundations of Peace. London (Macmillan), 1919.

Lytton (Neville). The Press and the General Staff. London (Collins), 1921.

Ludendorff (Genl.). The General Staff and its Problems. Trans. 2 Vols. London (Hutchinson), n.d.

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Forrest (Sir George). The Life of Lord Roberts. London (Cassell), 1914.

Weale (B. L. Putnam). The Truce in the East and its aftermath. London (Macmillan), 1907.

Guyot (Yves). The Causes and Consequences of the War. London (Hutchinson), 1916.

Fiennes (Gerard). Sea Power and Freedom. London (Skeffington), n.d.

Scott (Admiral Sir Percy). Fifty Years in the Royal Navy. London (Murray), 1919.

Domville-Fife (Charles). Submarines and Sea Power. London (Bell), 1919.

Fletcher (C. Brunsdon). The Problem of the Pacific. London (Heinemann), 1919.

Fletcher (C. Brunsdon). The New Pacific. London (Macmillan), 1917.

Steele (Capt. H.). The Canadians in France, 1915-1918. London (Fisher Unwin), 1920.

Fletcher (C. Brunsdon). Stevenson's Germany. The case against Germany in the Pacific. London (Heinemann), 1920.

The Memoirs of the Crown Prince of Germany. London (Thornton Butterworth), 1922.

Melville (Col. C. H.). Life of General Sir Redvers Buller, VC, G.C.B., G.C.M.G. London (Arnold), 1923.

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PART II.

NOTES ON FOREIGN JOURNALS.

Belgium.

Bulletin Belge des Sciences Militaires.—Jan., 1924.

Anti-aircraft defence.

Extracts from manual of employment of smoke.

Aeronautical notes (with map of air routes in Europe and N.Africa).

France.

Revue d'Artillerie.—Dec., 1923.

I. Why the army wanted the décigrade. Capt. Hurault.
II. Historical. Louis XIV's artillery. Maj. Pichat.
III. On the employment of trench mortars. Maj. Schneider.
IV. Apparatus for representing air bursts on miniature ranges. Maj. Jourdanet.
V. Graphical methods in the preparation of fire. Capt. Govin.
VI. "Tirs d'interdiction" (fire to deny access to certain localities). Capt. Courbis.
VII. German artillery handbooks. Maj. Laurent.

Revue Militaire Générale.—Dec. 1923.

Ludendorff's strategy on the Russian front, III. Dec. 1914 to Oct. 1915. Gen. Camon.

German methods of infantry combat. (Contd.) Maj. Pujo.

Revue Militaire Française.—Jan., 1924.

Smoke Shell. Maj. Menjaud.

German theory of war and the manual of Sept.1, 1921. Col. Jeanpierre.

Working of the Intelligence Section of an Army Corps Staff. Lt.-Col. Paquet.

The 1923 Motor Show. Maj. Doumenc.

The work of the French daylight bombing squadrons in the war, 1914-1918. Lt.-Col. Voisin.

Germany.

Militär-wissenschaftliche Mitteilungen.—November, 1923.

Hauptmann von der Leyen reviews the second volume of Combined Operations which has recently appeared. This publication replaces the old "Felddienstordnung."

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Heerestechnik, No. 11, November, 1923.

Major Klie, who was formerly employed in the Ordnance Commission, writes on the development of the '16 model field gun and the '16 model light field howitzer. This first instalment deals with the various experimental improvements made on the German field-gun up to August, 1916.

Dr. Koelzer concludes his article on the influence of temperature and wind on the travel of sound in the air.

"The present position in the matter of gas-warfare." The Spartans used gas against Plataea and Delion in the 5th century B.C. Many later historical instances of the use of gas in war are quoted. It is then explained that the modern use of gas was due to all the leading Allies, not to Germany.

After a short sketch of the public efforts made since the Great War to eliminate the use of gas in warfare, the writer proposes to examine the real intentions of other nations.

Militär Wochenblatt, No. 11, 10th December, 1923.

"Re Studies" emphasizes the necessity of intensive education of officers; in these days they must not remain mere drill-sergeants.

"Military political report from Great Britain."

The "Die-hardts," under Lord Derby, have prevented preparations for a conflict with France, with the exception of an increase in the Air Force.

Dr. Hanslian, late Gas Officer in the XII Reserve Corps, writes on "American chemical warfare organization in the World War." In the summer of 1918, there were 6 American gas companies making a total of 54 Allied gas companies (18,000 men and 1,500—2,000 officers). The Germans then had 8 gas battalions with 1,000 projectors each. The German projectors however, had a range of 3,000 metres at the end of the war, 1,200 metres more than those of the Allies. Details of English methods of gas warfare are given, and American efforts in this direction are described as not important. Nor did any American gas shells arrive in time to be used; the American artillery used French gas shells. However, the chemical production of America was increasing so rapidly at the end of the war, that its influence would have been very great.

No. 12.

Lucius Cincinnatus reviews the military political events of 1923.

General von Kuhl criticizes General Buat's book on the strategy of Hindenburg and Ludendorff.

Switzerland.

Revue Militaire Suisse.—Dec., 1923.

Aeroplane bombs.

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Vol. L. No. 2. May, 1923.

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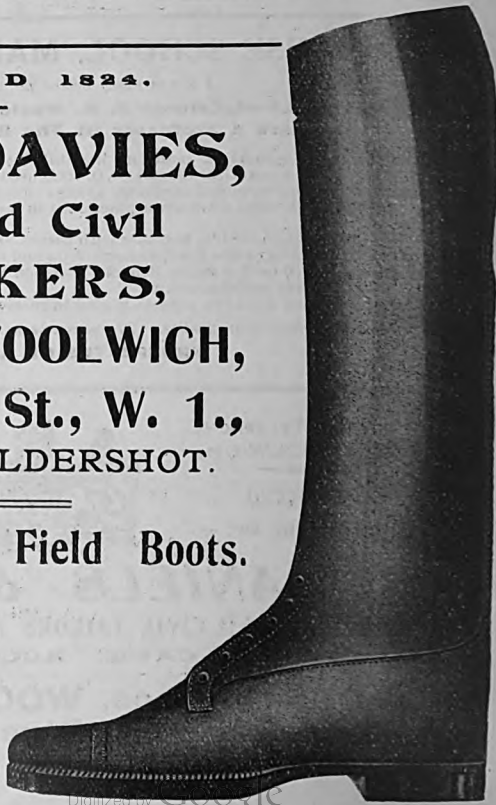

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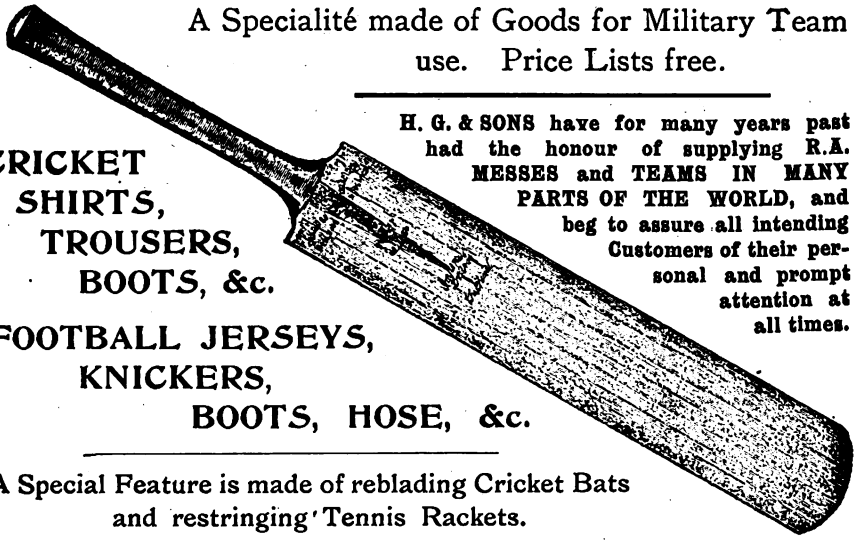

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